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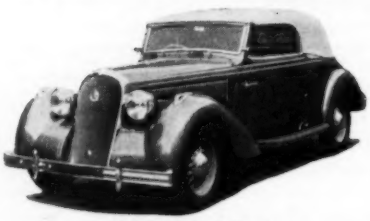

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ADDRESSES AND ORIGINAL ARTICLES

CHANGE IN THE AGE OF MORTALITY FROM DIPHTHERIA

By R. M. F. Picken, M.B., B.Sc., D.P.H.

MANSEL TALBOT PROFESSOR OF PREVENTIVE MEDICINE, WELSH NATIONAL SCHOOL OF MEDICINE

Thirty years ago Murphy (1907) drew attention to variations in the age of mortality in London from certain diseases, including diphtheria. His charts will still repay study. For diphtheria he showed that in the years of high prevalence from 1861 to 1865 the mortality at ages 4, 5–10, and 10–15 was low as compared with the average rates at these ages over the whole period 1859–1905, that the relative immunity at these ages gradually disappeared as the years progressed, and that, when high prevalence recurred in 1896–1900, it had been replaced by excessive susceptibility in relation to the average over the whole period. At younger ages the reverse had occurred. Briefly, diphtheria appeared to be attacking and killing children of school age to an increasing extent. He saw evidence of a waning of this movement with falling prevalence in 1901–05 and said of the increasing part taken by older children up to the end of the nineteenth century "I think this may probably be a natural increase, although it may have been accentuated by increase in aggregation of children at school. However this may be, I should expect to find the first evidence of recurrence of epidemic prevalence of diphtheria in increase of relative incidence upon ages 4, 5–10, and 10–15." He hoped that the figures for subsequent years would help to determine whether these changes were rhythmical.

Since Murphy wrote, the question has received a good deal of attention. Chalmers (1913) described a similar failure of the mortality at ages 5–10 to decline at the same speed as at younger ages in the death statistics of Scotland for groups of years from 1860–62 to 1909–11, and identified a progressive transference of notifications in Glasgow from ages under 5 to ages 5–10 during the years 1903 to 1912. Collis (1925), comparing the specific death-rates in England and Wales for 1901–10 with those for 1861–70, demonstrated a decline at all ages over 10 but an increase in both sexes at ages 0–5 and 5–10, the latter being the greater. Woods (1928) expressed these specific death-rates for England and Wales as percentages of the standardised death-rates from diphtheria for decennia from 1861 to 1910 and for the four-year period 1921–24, and showed conclusively that fatal diphtheria in 1921–24, as compared with 1861–70 and 1871–80, was concentrating on the age-group 5–10 while remaining stationary or tending to decline at younger and older ages.

In a very full discussion of the mortality from diphtheria in England and Wales and in London Forbes (1932) brought the records up to 1929, and traced from period to period since 1871 the changes of mortality in five-year age-groups up to 20–25 years. He tentatively confirmed Murphy's observation that diphtheria tended to become relatively more fatal in the later age-groups during times of high prevalence, especially in London. He suggested further that there was evidence that this process was extending even to young adult ages in recent years. The Registrar-General (1934), in an illuminating table, compares the rates of mortality at single ages up to 5 and at ages 10–15 with those at ages 5–10 for individual years 1901–34. He shows that throughout the whole of this century there has been a progressive shifting of mortality risks toward school age, and mentions a similar change in Prussia. His table indicates that the risk at ages 10–15 in post-war years had been, on the whole, greater than pre-war, even when expressed in terms of the rapidly rising risk at ages 5–10.

MORTALITY AFFECTED BOTH BY INCIDENCE AND BY FATALITY

With the exception of Chalmers these writers have each confined their attention to mortality, reasonably assuming that age-mortality was a measure of age-prevalence. Chalmers's table of notifications in Glasgow expressed the cases in each age-group as a percentage of the total at all ages in each year, taking no account of changes of age of the population; the transference of notifications to school age appeared to be taking place too rapidly to be explained entirely by such changes. It has seemed to me that the respective factors of incidence and fatality might be worthy of further exploration. The most satisfactory way of doing so would possibly have been to investigate the age-fatality of hospital cases, but unfortunately it is impossible to get such statistics of sufficient magnitude in satisfactory age-groups over a long series of years without putting others to labour which hardly seems justifiable. Woods (1933) discusses at some length the value of notification records and of hospital fatality-rates, and concludes that they both have their defects. She points to the obvious fallacy arising from increased bacteriological diagnosis of diphtheria in recent years, swelling the toll of mild cases. Indeed this, among other problems, has caused the London County Council to issue a special report on the nomenclature of diphtheria (1936) and to include the special designation "bacteriological diphtheria" in its tables of hospital discharges. Nevertheless the graph of notification rates in England and Wales for diphtheria and scarlet fever (which tend to run in harness) shows little divergence throughout the period since 1911 for which these figures are available, suggesting that bacteriological methods have not greatly increased the number of notifications in recent years throughout the whole country. It is not possible to determine whether other changes of fashion have raised the notification rates for both diseases. In London, however, with which this paper is largely concerned, there does seem to have been an exceptionally high notification rate for diphtheria since 1921, a fact upon which the Registrar-General has commented from time to time. A part, therefore, of the apparently great fall in fatality in recent years is probably artificial, and the fact that it is demonstrable in hospital statistics does not detract from this conclusion since very few notified cases nowadays fail to be admitted. The picture is still further confused by the exceptionally large proportion of wrong or doubtful diagnoses of diphtheria. The important question for practical purposes is whether these fallacies may be differential as regards age-groups. As a test of the validity of placing certified deaths against notifications, rates have been calculated and compared with hospital fatality-rates so far as these are available, as shown in Table A.

The age-distributions of the fatality of all cases and of hospital cases were somewhat different in the first ten years of the century. In this connexion it may

be noted that the proportion of hospital admissions to notifications was only 65 per cent. in 1901–05 and 67 per cent. in 1906–10, whereas in 1935 it was 99 per cent. (if all the cases admitted and classed as "bacteriological diphtheria" were included among the notified; even if they were all excluded the

TABLE A—*London: Diphtheria Fatality at Certain Ages as Percentage of Rate at 5–10 Years (Rates based on all Notifications and Deaths compared with Hospital Rates).*

Period.	—	0–5	5–10	10–15
1901–05 ..	All cases	224	100	36
	Hospital cases ..	188	100	42
1906–10 ..	All cases	240	100	28
	Hospital cases ..	191	100	53
1932–35 ..	All cases	125	100	49
1935 ..	Hospital cases ..	131	100	39

percentage of admissions was 88). In the earlier years, then, it is likely that the fatality at ages over 5 was weighted in hospital by the admission of a preponderance of grave cases, and it is also possible that a large proportion of the rapidly fatal cases under 5 used to die at home. However this may be, the indices are reasonably similar in magnitude and trend; it seems that no very great fallacy will arise from studying specific fatality-rates based on notifications and deaths.

SOURCES OF INFORMATION

In pursuing an investigation of this kind one has to take data where they can be found. Notifications for England and Wales are available only since 1911 and they are not classified by age and sex. The material has therefore been derived from London, Manchester, and Glasgow. At the outset it should be said that what has happened in these large towns is not necessarily true for other parts of the country. There is some evidence that it is not. Unfortunately most of the annual reports of medical officers of health group together the notifications and deaths from infectious diseases at all ages from 5 to 15, and the Registrar-General classifies local deaths in the same way. For the diseases predominantly affecting childhood such classification is of little value, and it is therefore difficult to carry the inquiry into many areas.

AGE-MORTALITY IN ENGLAND AND WALES

In order to test whether the movement of specific death-rates in London is comparable with that in England and Wales rates have first been calculated for the whole country. These differ from the figures given in the papers quoted above, as they apply to groups of five years around censuses commencing in 1901. Earlier data have not been used because comparisons between the records of diphtheria of last century and the present are questionable. In the early days of registration scarlet fever was imperfectly differentiated from diphtheria and croup was only diphtheria to an undetermined extent, although it has been customary to combine the two causes. Moreover, notification, with its stimulus to diagnosis, became universal only in the last decade of the nineteenth century and almost immediately thereafter antitoxin treatment began to affect mortality. In spite of the increasing influence of bacteriological diagnosis the figures of the past 37 years have probably a more uniform meaning than formerly. In all the tables in this paper deaths

TABLE I*

England and Wales: Diphtheria Deaths and Death-rates per Million† at Certain Ages in Certain Periods

Period.	—	0–	5–	10–15	0–15
MALES					
1899–1903	Deaths.	12,850	5,608	971	
	D.R. ..	1,385 ±27	645±19	116 ±8	738 ±12
1909–13 ..	Deaths.	6,546	3,684	620	
	D.R. ..	676 ±19	399±15	71 ±6	392 ± 8
1919–23 ..	Deaths.	5,380	3,904	971	
	D.R. ..	640 ±19	442±16	106 ±8	388 ± 9
1929–33 ..	Deaths.	3,200	2,823	690	
	D.R. ..	424 ±17	334±14	85 ±7	278 ± 7
FEMALES					
1899–1903	Deaths.	12,588	6,815	1,097	
	D.R. ..	1,353 ±27	780±21	131 ±9	776 ±12
1909–13 ..	Deaths.	6,119	4,694	703	
	D.R. ..	638 ±18	508±16	80 ±7	417 ± 9
1919–23 ..	Deaths.	5,116	4,577	1,107	
	D.R. ..	624 ±19	522±17	121 ±8	414 ± 9
1929–33 ..	Deaths.	2,868	3,191	807	
	D.R. ..	388 ±16	388±15	101 ±8	291 ± 8
PERSONS					
1899–1903	D.R. ..	1,369 ±19	713±14	124 ±6	757 ±8
1909–13 ..	,, ..	657 ±13	453±11	76 ±3	405 ±6
1919–23 ..	,, ..	632 ±14	482±12	114 ±6	401 ±6
1929–33 ..	,, ..	406 ±12	362±10	93 ±5	285 ±5

* In this, and the other main tables, rates in age- and sex-groups over 15 years have been omitted. They have been calculated, but the numbers of cases and deaths are too small to give rates of significance. The actual numbers of cases and deaths in the three age-groups of childhood are included in some tables because they are not very easily found elsewhere.

† In Tables I, II, and III this is based on census populations of the central year in each period.

D.R. = Mean annual death-rate.

from croup—which are very small in number—are ignored.

Table I bears out the general observation that diphtheria has greatly declined in England and Wales as a cause of mortality at all ages under 15 years, and that there has been little difference in this respect as between the sexes. Males, however, as has been frequently noted, have succumbed to a greater extent at ages under 5, the reverse being markedly the case at ages 5–10 and 10–15, so that the

TABLE B—*England and Wales: Diphtheria Mortality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5			5–10	10–15		
	P.	M.	F.	—	P.	M.	F.
1899–1903	192	215	173	100	17	18	17
1909–13 ..	145	169	126	100	17	18	16
1919–23 ..	131	145	119	100	24	24	23
1929–33 ..	112	127	100	100	26	25	26

P. = persons; M. = males; F. = females.

death-rate among females at the combined ages is consistently higher. The relations between the specific rates may be expressed as in Table B.

When the death-rate at ages 5–10 is represented as 100 for males or females or both sexes, the index for children below these ages is seen to have fallen from about 200 to a figure approximating to 100. For females the two rates have become identical.

TABLE II

London: Diphtheria Deaths and Death-rates per Million at Certain Ages in Certain Periods

Period.	—	0–	5–	10–15	0–15
MALES					
1899–1903	Deaths.	2,275	766	123	
	D.R. ..	1,835 ±86	694 ±55	120 ±24	936 ±36
1909–13 ..	Deaths.	862	314	26	
	D.R. ..	733 ±56	292 ±37	25 ±11	369 ±24
1919–23 ..	Deaths.	1,342	740	172	
	D.R. ..	1,408 ±86	739 ±61	167 ±29	759 ±36
FEMALES					
1899–1903	Deaths.	2,248	972	120	
	D.R. ..	1,817 ±86	872 ±63	113 ±23	980 ±38
1909–13 ..	Deaths.	818	398	51	
	D.R. ..	700 ±55	367 ±40	49 ±15	387 ±24
1919–23 ..	Deaths.	1,267	838	198	
	D.R. ..	1,362 ±86	842 ±65	194 ±31	780 ±36
PERSONS					
1899–1903	D.R. ..	1,826 ±61	786 ±41	117 ±17	958 ±26
1909–13 ..	,, ..	719 ±38	327 ±27	37 ± 9	379 ±17
1919–23 ..	,, ..	1,388 ±61	790 ±44	181 ±21	769 ±25
1929, 30, 32, & 33	Deaths.	773	540	107	
	D.R. ..	649 ±47	412 ±35	84 ±16	375 ±20

At ages 10–15 mortality is increasing in importance even as compared with the rate at 5–10 years and therefore much more in relation to the rate under 5 years. Death is sparing the very young far more than those of later ages.

SPECIFIC RATES OF MORTALITY, INCIDENCE, AND FATALITY IN LONDON

In Table II corresponding rates are given for London. The deaths for 1931 are not available in the required age-grouping and those for the sexes separately cannot easily be obtained for any of the last group of years. The relations of the specific rates may be summarised, as before, in Table C.

TABLE C—*London: Diphtheria Mortality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5			5–10	10–15		
	P.	M.	F.	—	P.	M.	F.
1899–1903 ..	232	264	208	100	15	17	13
1909–13 ..	220	251	190	100	11	9	13
1919–23 ..	176	190	162	100	23	23	23
1929, 30, 32, & 33	157	—	—	100	20	—	—

In London the movement has been the same as in England and Wales, although children under 5 years have been, and continue to be, relatively more affected than in the country generally. So far as the comparison extends, the mortality under 5 years has again exceeded that at ages 5–10 to a greater extent among males than females.

Whether this movement and these relations are attached to incidence or fatality remains to be examined. Using notifications as a measure of incidence I have prepared Table III for the periods covered by Table II. It shows the specific case-rates. Their relations are exhibited, as before, in Table D.

TABLE III

London: Diphtheria Notifications and Rates per Million at Certain Ages in Certain Periods

Period.	—	0–	5–	10–15	0–15
MALES					
1899–1903	Cases	10,794	8,157	2,799	
	C.R...	8,709 ±187	7,404 ±183	2,695±114	6,435± 97
1909–13	Cases	6,659	5,523	1,765	
	C.R...	5,679 ±155	5,117 ±154	1,774± 94	4,294± 80
1919–23	Cases	10,375	11,011	4,746	
	C.R...	10,900 ±238	10,993 ±233	4,664±151	87,96±121
FEMALES					
1899–1903	Cases	10,281	9,907	3,602	
	C.R...	8,300 ±182	8,907 ±199	3,399±126	6,977±100
1909–13	Cases	6,015	6,613	2,359	
	C.R...	5,166 ±149	6,077 ±166	2,325±107	4,586± 84
1919–23	Cases	9,236	12,475	6,068	
	C.R...	9,945 ±230	12,503 ±249	5,896±169	9,399±125
PERSONS					
1899–1903	C.R...	8,505 ±130	8,160 ±135	3,051± 84	6,707± 70
1909–13	,, ..	5,423 ±120	5,597 ±113	2,052± 71	4,441± 57
1919–23	,, ..	10,429 ±165	11,747 ±173	5,284±113	9,097± 87
1929–33	Cases	17,050	19,199	6,557	
	C.R...	11,476 ±195	11,722 ±188	4,062±111	9,036± 97

C.R. = Mean annual case-rate.

Selective incidence among males under 5 years seems to follow their selective mortality, and indeed, as will be shown later, may be the main explanation of it. The notification rates for the combined sexes at ages under 5 and at 5–10 have not been very different from one another in each period. Such decline as has occurred in the relative importance of the younger ages is moderate and uncertain and has not been carried on to the most recent period.

TABLE D—*London: Diphtheria Incidence at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5			5–10	10–15		
	P.	M.	F.	—	P.	M.	F.
1899–1903	104	118	93	100	37	36	38
1909–13 ..	97	111	85	100	37	35	38
1919–23 ..	89	99	79	100	45	42	47
1929–33 ..	98	—	—	100	35	—	—

When the case-rates in the age-group 0–5 are compared with the corresponding rates at ages 5–10 practically all the differences lie within errors of random sampling. The tendency of the mortality at later ages to assume increasing importance may have

been partly due to a shift of incidence, but this explanation does not apply to the most recent years when this shift has been less pronounced than in the two preceding periods. It may be noted that the first and third of the four periods included years of exceptionally high prevalence, but they are least in accord as regards the relative incidence at early and later ages.

TABLE IV

London: Diphtheria, Percentage of Deaths to Notifications at Certain Ages in Certain Periods

Period.	0–	5–	10–15	0–15
	MALES			
1899–1903	21·08 ±0·38	9·39 ±0·31	4·39 ±0·39	14·55 ±0·24
1909–13 ..	12·94 ±0·40	5·68 ±0·31	1·47 ±0·29	8·62 ±0·24
1919–23 ..	12·93 ±0·33	6·72 ±0·24	3·62 ±0·27	8·62 ±0·17
	FEMALES			
1899–1903	21·86 ±0·41	9·81 ±0·30	3·33 ±0·30	14·04 ±0·22
1909–13 ..	13·60 ±0·44	6·02 ±0·29	2·16 ±0·30	8·45 ±0·23
1919–23 ..	13·72 ±0·36	6·72 ±0·22	3·26 ±0·23	8·29 ±0·16
	PERSONS			
1899–1903	21·46 ±0·28	9·62 ±0·22	3·80 ±0·24	14·28 ±0·16
1909–13 ..	13·25 ±0·30	5·87 ±0·21	1·87 ±0·21	8·53 ±0·16
1919–23 ..	13·30 ±0·24	6·72 ±0·16	3·42 ±0·17	8·45 ±0·12
1929, 30, 32, & 33	5·50 ±0·19	3·30 ±0·14	1·94 ±0·19	3·95 ±0·10

In Table IV the proportions of deaths to notifications in age- and sex-groups in London are shown for the same periods of years as before. Diphtheria has tended to be less fatal among all female children than males, but if there is any real difference it is due to the relative exemption of females from attack at ages under 5, for the fatality at this age and at ages 5–10 is, if anything, greater. Over the periods under review the proportion of deaths to notifications has fallen greatly. So probably has the real fatality, although it would be difficult to determine the influence of increased bacteriological diagnosis on these rates. If diagnosis were assumed to have been more thorough in 1919–23 than in 1909–13 then diphtheria must have been definitely more virulent in the later period, for the fatality, even as here measured, was slightly greater in each of the three five-year age-groups under 15 years. The relations between the rates at different ages throughout this series of years may be expressed, as before, in Table E.

TABLE E—*London: Diphtheria Fatality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5			5–10	10–15		
	P.	M.	F.	—	P.	M.	F.
1899–1903 ..	223	224	223	100	39	47	34
1909–13 ..	226	228	226	100	32	26	36
1919–23 ..	198	192	204	100	51	54	48
1929, 30, 32, & 33	167	—	—	100	59	—	—

The post-war shift of mortality to later ages is seen to have been accompanied by a very similar change in the fatality relations. In this case the figures, so far as they go, indicate that the change of fatality from the disease has not been different as between males and females. When read in conjunction with the movement of incidence rates, the above table indicates that in the last period the movement of mortality to later ages is entirely due to the increasing importance of the fatality at these ages.

TABLE V

London: Diphtheria, Percentage of Deaths to Notifications at Certain Ages in Certain Pre-war and Post-war Periods

Period.	—	0–	5–	10–15	0–15
		MALES			
1901-05	C.	8,899	6,275	2,155	
	D.	1,509	502	63	
	F.	16·96 ±0·40	8·00 ±0·33	2·92 ±0·36	11·97 ±0·25
1906-10	C.	7,498	5,604	1,742	
	D.	1,162	358	31	
	F.	15·50 ±0·42	6·39 ±0·33	1·78 ±0·32	10·45 ±0·25
1921-25	C.	11,764	10,207	4,614	
	D.	1,221	550	144	
	F.	10·38 ±0·28	5·39 ±0·22	3·12 ±0·26	7·20 ±0·16
1926-29	C.	8,890	9,229	2,934	
	D.	506	248	44	
	F.	5·69 ±0·25	2·69 ±0·17	1·50 ±0·22	3·79 ±0·13
		FEMALES			
1901-05	C.	8,250	7,767	2,763	
	D.	1,497	598	75	
	F.	18·14 ±0·42	7·70 ±0·30	2·71 ±0·31	11·55 ±0·23
1906-10	C.	7,022	6,939	2,358	
	D.	1,055	440	42	
	F.	15·02 ±0·43	6·34 ±0·29	1·78 ±0·27	9·42 ±0·23
1921-25	C.	10,178	11,249	5,838	
	D.	1,099	654	170	
	F.	10·80 ±0·31	5·81 ±0·22	2·91 ±0·22	7·05 ±0·15
1926-29	C.	7,662	9,846	2,621	
	D.	460	309	46	
	F.	6·00 ±0·27	3·14 ±0·18	1·75 ±0·26	4·05 ±0·14
		PERSONS			
1901-05	F.	17·53 ±0·29	7·83 ±0·23	2·81 ±0·24	11·75 ±0·17
1906-10	F.	15·27 ±0·30	6·36 ±0·22	1·78 ±0·21	9·91 ±0·17
1921-25	F.	10·57 ±0·21	5·61 ±0·16	3·00 ±0·17	7·13 ±0·11
1926-30	C.	21,114	24,127	8,038	
	D.	1,223	702	121	
	F.	5·79 ±0·16	2·91 ±0·11	1·46 ±0·13	3·82 ±0·08
1932-35	C.	12,705	14,707	5,271	
	D.	690	637	111	
	F.	5·43 ±0·20	4·33 ±0·17	2·11 ±0·20	4·40 ±0·11

C. = cases; D. = deaths; F. = fatality.

The comparison is carried further in Table V which covers two almost continuous series of years from 1901–10 and from 1921–35. The most impressive features of the table are the fall of fatality at ages under 5 years, and the recent arrest of the decline at later ages. This is especially striking in the last four years when a rise at ages 5–10 and 10–15 has been sufficient to increase the rate at all ages under 15, although that at ages under 5 years has continued to fall slightly. These points are epitomised in Table F.

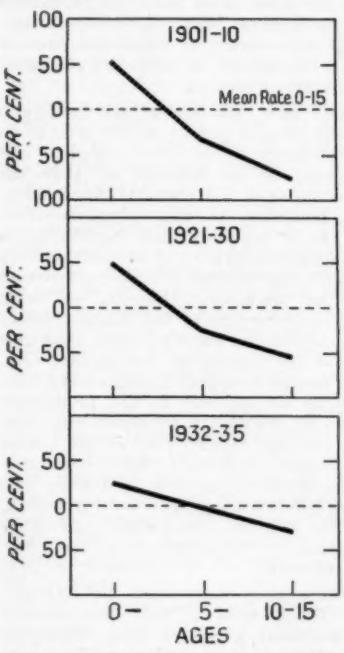
As there is no pronounced or uniform difference in the sexes, it is perhaps of little importance that

the rates for males and females separately are not available for 1932–35. Although fatality at ages 5–10 has been relatively more important during the whole post-war period, the movement has fluctuated. The figures on which the rates are based are reasonably large and the irregularities are probably real. It can readily be understood that variations in the social classes affected by the disease from time to time might heavily influence the fatality at older ages. Such variations cannot easily be ascertained. The period 1932–35 is unique in the importance assumed by the age-group 5–10 years. The point is also illustrated in the Chart, showing the rate at each age-period as a percentage of the rate at ages 0–15 in three groups of years.

TABLE F—*London: Diphtheria Fatality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5			5–10	10–15		
	P.	M.	F.	—	P.	M.	F.
1901–05 ..	224	212	236	100	36	36	35
1906–10 ..	240	243	237	100	28	28	28
1921–25 ..	188	193	186	100	53	58	50
1926–30*..	199	211	191	100	50	56	56
1932–35 ..	125	—	—	100	49	—	—

* For the sexes separately the period is 1926–29.



London. Diphtheria fatality at certain ages as percentage of rate at ages 0–15.

FATALITY-RATES IN MANCHESTER

In order to test whether these changes are peculiar to London, attention may be turned elsewhere. The annual report of the medical officer of health of Manchester has included tables of the cases and deaths of each of the important infectious diseases in short age-groups (sexes undistinguished) since 1891. In his report for 1933 Dr. Veitch Clark commented upon the change of age-incidence of diphtheria in the last twenty years. Table VI presents an analysis of the figures of cases and deaths since the beginning of the present century, excluding the decade in which the war occurred. The proportion of deaths to notifications at all ages under 15 years has usually been more than twice as high as in London. It is difficult to believe that this great excess can have been entirely due to less observance of notification in a large town which has a vigorous health department, and is also a teaching centre in medicine.

TABLE VI

Manchester: Diphtheria, Percentage of Deaths to Notifications at Certain Ages in Certain Periods

Period.	—	0–	5–	10–15	0–15
1901-05	C.	1,040	875	254	2,169
	D.	382	193	18	593
	F.	36·73 ±1·49	22·06 ±1·40	7·09 ±1·61	27·34 ±0·96
1906-10	C.	1,316	874	225	2,415
	D.	400	120	11	531
	F.	30·39 ±1·27	13·73 ±1·16	4·90 ±1·43	21·99 ±0·84
1921-25	C.	1,185	1,602	663	3,450
	D.	200	116	32	348
	F.	16·88 ±1·09	7·24 ±0·65	4·83 ±0·83	10·09 ±0·50
1926-30	C.	1,503	2,175	717	4,395
	D.	218	150	18	386
	F.	14·50 ±0·91	6·90 ±0·54	2·51 ±0·58	8·78 ±0·43
1931-35	C.	957	1,717	764	3,438
	D.	132	174	41	347
	F.	13·79 ±1·11	10·13 ±0·73	5·37 ±0·81	10·09 ±0·50

Part of it may be due to deliberate exclusion of unverified cases. This, however, is not the main point at issue. The relative importance of the fatality at ages may be tested, as before, in Table G.

The movement is not quite the same as in London. The smaller numbers for Manchester make the comparison less valid. By chance the relationships in any one of the quinquennia might have been very different, but it is probably more than a mere coincidence that here also the fatality at ages 5–10 has become more important in the last ten, and especially the last five, years. Indeed, when the specific rates of deaths to notifications over the whole series of years from 1891 to 1930 are calculated * and compared with the rates in 1931–35 they show a significantly different relationship between the rates for the two lower age-groups from that which holds at the present time.

TABLE G—*Manchester: Diphtheria Fatality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5	5–10	10–15
1901–05	166	100	32
1906–10	221	100	36
1921–25	233	100	67
1926–30	210	100	36
1931–35	136	100	53

FATALITY-RATES IN GLASGOW

From records given by Chalmers (1913), and others contained in the annual reports of the medical officer of health of Glasgow, specific proportions of deaths to notifications can be calculated for certain years, and these are set out in Table VII. Expressed as before, the fatality-rates are related as in Table H.

The proportions of deaths to notifications at all ages under 15 years have been comparable with those in London but much lower than in Manchester, although the social circumstances and medical standards of the two industrial cities are not dissimilar.

* Ages 0–5: 8645 cases, 2463 deaths, fatality 28·49 per cent.
Ages 5–10: 8792 cases, 1048 deaths, fatality 11·92 per cent.
Ages 10–15: 2924 cases, 132 deaths, fatality 4·51 per cent.

TABLE VII

Glasgow: Diphtheria, Percentage of Deaths to Notifications at Certain Ages in Certain Periods

Period.	—	0–	5–	10–15	0–15
1903-07	C.	2,141	1,240	386	3,767
	D.	443	95	14	552
	F.	20·69 ±0·87	7·66 ±0·75	3·63 ±0·95	14·65 ±0·58
1908–12	C.	3,772	2,765	886	7,423
	D.	689	179	29	897
	F.	18·27 ±0·63	6·47 ±0·47	3·27 ±0·60	12·08 ±0·38
1924–28	C.	3,997	3,863	1,438	9,298
	D.	465	134	11	610
	F.	11·63 ±0·51	3·47 ±0·29	0·76 ±0·23	6·56 ±0·26
1929–33	C.	3,430	4,507	1,666	9,603
	D.	358	175	41	574
	F.	10·44 ±0·51	3·88 ±0·29	2·46 ±0·38	5·98 ±0·24
1934–35	C.	1,377	1,979	876	4,232
	D.	147	93	18	258
	F.	10·67 ±0·83	4·70 ±0·48	2·05 ±0·48	6·10 ±0·37

Since 1924 the fatality at these combined ages seems to have fallen little, if at all, and at ages 5–10 the tendency has been upward although the numbers are too small to establish the movement definitely. Here, again, it may be said that the relative importance of the fatality at ages has varied from time to time, but that there is the same recent tendency for the ages 5–10 to count more heavily, especially in the last two years.

TABLE H—*Glasgow: Diphtheria Fatality at Certain Ages as Percentage of Rate at 5–10 Years*

Period.	0–5	5–10	10–15
1903–07	270	100	47
1908–12	282	100	50
1924–28	335	100	22
1929–33	269	100	63
1934–35	227	100	44

DISCUSSION

The fall in the death-rate from diphtheria throughout the present century has been great and fairly continuous in England and Wales. As would be expected local fluctuations are more pronounced, but the trend is downward. Like scarlet fever the disease is generally thought to be no less common than formerly, and notifications, for what they are worth, and especially in their contemporaneous fluctuation with those of scarlet fever, support this view. If it is correct, diphtheria is following scarlet fever in becoming a less fatal disease, and this amelioration may not be entirely due to better, earlier, and more frequent treatment in hospital. If it is, as in the case of scarlet fever, a process not dependent upon ad-hoc measures, other changes in the behaviour of the two diseases might be expected to agree. Woods (1928) has shown that diphtheria mortality has reacted less at ages 5–10 than at other ages, although the general tendency of death to be transferred to still later ages observed in scarlet fever was not demonstrable for diphtheria over the period with which she dealt. The Registrar-General (1934) does, however, indicate that this movement is extending into ages 10–15. The specific death-rates shown in this paper for England and Wales and for London confirm this tendency. There is, therefore, some ground for believing that a process common to the two diseases is at work.

The assumption that these changes in the specific rates of mortality are due to changes of incidence seems to be only partly justified. Incidence rates, and the proportions of deaths to notifications, at ages in London indicate that the state of affairs is more complex. On the whole there may have been a relative reduction in the case rate at ages under 5 years, as compared with later ages, until recently but it is not specially notable in the quinquennial period around the census of 1931. On the other hand, since the beginning of the century the decline of the fatality under 5 years of age in London has been much more rapid than at later ages. This also has not been a perfectly continuous movement, but it is revealed to a most striking extent in the rates for 1932–35 in comparison with earlier years and especially with the first decade of the century. In Manchester the fatality under 5 years has figured much less prominently in 1931–35 than in any other post-war period or in the quinquennium 1906–10, but an exceptionally high fatality at ages 5–10 in 1901–05 served to reduce the relative importance of the younger ages. The movement is somewhat similar in Glasgow over the period for which data are available, but it may have set in later and it certainly has not gone so far as in London or Manchester. In all three cities the most prominent factor in the recent increase, or arrest in the decline, of fatality at all ages under 15 years has been a rise in the fatality at ages 5–10, although the small changes in Glasgow are equivocal.

It seems unlikely that this shift of the fatality is artificial. The educational period of life is that at which detection is likely to be most complete and notifications, indeed, to be inflated, so that the apparent fatality at ages 5–15 should have fallen most since the inception of the school medical service. Again, it is probable that immunisation in London and Manchester (it has not been extensively practised in Glasgow) has reached a higher proportion of school than of pre-school children. A table contained in the annual report of the medical officer of health of Manchester for 1935 indicates that this is especially true of the age-group 5–10 in that city. As protection is a matter of degree it might have been expected to lead to an increase in the proportion of less fatal cases of diphtheria at these ages, and so to reduce the average fatality-rate at the period of life when the reverse appears to have happened. Incidentally, the suspicion expressed by Dudley and others (1934) that immunisation, by creating carriers, would increase the risk for pre-school children is not so far confirmed by the incidence or mortality in London or Manchester.

The theory tentatively mentioned by Murphy and quoted by other writers, that the relative hesitancy of the mortality at ages 5–10 to fall at the end of the nineteenth and the beginning of the present century was due to aggregation of children in school, will hardly bear examination. It has been continuous over a long period without any increase in the aggregation, and it has apparently not been mainly a change of incidence. The excess incidence on females as compared with males at ages 5–15 hardly seems to lend itself to the explanation that they are brought more into contact with younger infective children.

It is interesting, but perhaps not very profitable, to speculate on the natural processes that might account for the movement. Such differences are not peculiar to diphtheria. They can be seen in the comparison between epidemics of any infectious

disease affecting urban and rural communities, notably those which, like poliomyelitis, are sporadic over long periods but occasionally take on epidemicity (Friedemann 1928, and Aycock 1928). The age-variation of Schick immunity by class and locality is now a matter of common observation and is associated with differences of age-mortality. The relative infrequency of patent or latent infections in a community might allow its herd-immunity to decline (Dudley 1936), so leading to a change in the relative susceptibility of the population at later ages to contract the disease and die of it. Considerable periods of low prevalence of diphtheria do occur in localities and it would be interesting to compare the age-incidence and age-fatality of the disease during the months of rise and the period of decline in the aggregate of a series of epidemics, if numbers of sufficient magnitude could be observed. So far as the data in this paper go, they do not indicate that exacerbations of incidence are the governing factor, although the point may have been obscured by the periods chosen for analysis.

The most striking instance of unusual age-mortality of a disease in modern times was afforded by the influenza epidemic of 1918–19. It seems to have been due less to departure from the usual age-incidence of the disease than to a change in the ages affected by its chief mortal complication (pneumonia), accompanied by a change in the age-fatality of that complication (Collins 1931, 1934). No explanation but an alteration in the nature of the virus or its symbiotics seems to meet this case. In connexion with diphtheria the most notable observation in modern times has been the differentiation of the corynebacterium into types. In a summary of the position Cooper and others (1936) comment on the fact that a change of predominance from *intermediate* to *gravis* strains occurred in Manchester between 1933 and 1934, but less detailed information is available as to the position in London and Glasgow. In neither of these towns does there seem to have been an excess of *gravis* strains at any time when examinations were made during the years 1933 to 1935, but the proportion of *mitis* strains was low in London. The association of *mitis* strains with laryngeal diphtheria is now generally recognised (Cooper and others 1936). A reduction in the prevalence of these strains might therefore be attended by a fall in the fatality among very young children who succumb most readily to laryngeal involvement, while a rise of the more toxic *gravis* or *intermediate* strains might increase the risk for those a little older. I understand that such a reduction of laryngeal diphtheria in recent times has been noted in London.

PRACTICAL CONSIDERATIONS

The present policy of health departments is to concentrate on the immunisation of children in the second year of life. This is no doubt sound, in theory, as a means of gradually building up an immune population. The argument often used, however, in support of the practice—viz., that diphtheria is specially fatal under 5 years—is less valid at the present time than it used to be. It is easier to persuade parents to accept immunisation for school-children and much easier to organise its administration at these ages. In view of the increased part taken by the age-group 5–10, and to some extent 10–15, in mortality there is much to be said at the present time for adhering to the earlier policy of making sure that the younger school population is thoroughly dealt with, while using every possible means of persuasion to induce parents to accept immunisation also for infants at the end of the first year of life.

SUMMARY

1. The well-known shift of diphtheria mortality from pre-school to school ages in England and Wales and in London is shown to have been continued up to recent times.

2. In London it is apparently not due entirely, or even mainly, to a change of incidence.

3. There has been a shift of fatality to later ages in London which is most striking in the period 1932–35. It is probably not artificial.

4. A similar change in fatality can be traced in Manchester and Glasgow but should not be assumed to have occurred in other areas.

5. The explanation may possibly be found in changes of strain of *Corynebacterium diphtheriæ*.

6. It is suggested that immunisation of the younger school-children should not be neglected in favour of infants at the end of the first year of life.

I am indebted for some of the records used in this paper to Dr. W. Gunn, medical superintendent to the North-Western Hospital, London, to Dr. R. Veitch Clark, medical officer of health, Manchester, and to Dr. A. S. M. Macgregor, medical officer of health, Glasgow; and, for making extracts from many reports for me and advice on certain statistical points, to Mr. W. T. Russell of the London School of Hygiene and Tropical Medicine. None of them is responsible for the way in which the figures have been used.

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MASSIVE SPONTANEOUS INTRAPERITONEAL HÆMORRHAGE

(SPONTANEOUS HÆMOPERITONEUM)

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MASSIVE intraperitoneal hæmorrhage is occasionally encountered as a sequel to trauma, malignant disease, and in the female ectopic gestation. Apart from such circumstances, spontaneous bleeding of serious degree is one of the rarest of vascular accidents, and certainly one of the rarest of acute abdominal catastrophes. In individual experience it is so infrequent that when it is discovered at operation for acute abdominal symptoms, the surgeon is apt to be embarrassed, and inadequate both in his investigation and in his treatment.

The cases presented here have certain features of interest which make them worthy of report; and I have thought it well to review what has been written on the subject, in an endeavour to determine what exploratory procedures are likely to be useful on such occasions.

SPONTANEOUS INTRAPERITONEAL HÆMORRHAGE IN THE FEMALE

CASE 1.—The patient, a well-developed girl of 19, was admitted to hospital with a history that on the previous day she was seized with spasmodic pain in the lower abdomen. The pain was worse on the right side, and she thought that at the beginning it radiated to the back. On the day of admission she vomited on two occasions. There were no urinary or bowel symptoms of note, and the menstrual history was normal. She was, however, due to menstruate on the day of admission.

On first examination the clinical findings were largely negative save for some deep tenderness in the right iliac fossa. A tentative diagnosis of mild catarrhal appendicitis was made, and it was decided to admit her for observation. In the course of the forenoon, however, her temperature, previously normal, rose a little, the pain in the lower abdomen increased, and some lower abdominal rigidity appeared. The diagnosis was apparently confirmed and operation was advised. By the time it was carried out her condition had become further aggravated. The pulse was rapid, thready, and her complexion was greyish, her facies anxious, and she was very restless.

The abdomen was opened by McBurney's method, and at once there was an escape of bright red fluid blood containing some clots. The appendix and cæcum were normal, and accordingly a paramedian incision was now made and the pelvis inspected. It contained a large quantity of blood, and after this was evacuated the source of the hæmorrhage was found to be a ruptured cyst in the left ovary, which even then was bleeding very profusely. The remainder of the ovary, the tubes, and the uterus were all congested, probably because she was due to menstruate. A left oöphorectomy was carried out and the wound closed without drainage. The recovery was completely uneventful.

I had on several occasions operated on cases of ruptured ovarian cysts in which there was a small amount of blood in the pelvis. Indeed, along with ruptured ectopic pregnancy, this condition constitutes the bulk of intraperitoneal bleedings in the female sex. Seldom, however, does the hæmorrhage attain the massive proportions which it did in this instance, and it is rarely sufficient to be a source of danger. Phaneuf (1924) has recorded 42 examples of the condition and finds there is fairly equal liability to the accident in the follicular and the luteal varieties of cyst. A rarer and less well-recognised cause of hæmorrhage in the female is rupture of the dilated or varicose veins which are occasionally found on the surface of a subperitoneal fibromyoma of the uterus. Ernst and Gammeltoft (1921) reported 23 cases of this kind, and pointed out that the accident is apt to be fatal if the rupture takes place into the broad ligament.

Spontaneous hæmoperitoneum from rupture of an ectopic gestation has a more serious prognosis than the other varieties, for the blood remains sterile only for a few hours. Thus, of 17 cases recorded by Dudgeon and Sargent (1905) in only 7 was there no infection after two hours. The usual infecting organism was the *Staphylococcus albus*, and it is to infection that the febrile course of the condition is apparently due.

It is abundantly obvious that in the female the source of intraperitoneal hæmorrhage is usually to be looked for in relation to the pelvic viscera. Nevertheless there are instances in which the bleeding originates in conditions common to both sexes, and these will now be considered.

SPONTANEOUS HÆMORRHAGE COMMON TO BOTH SEXES

A variety of conditions that are common to the two sexes may manifest their presence by severe intra-abdominal hæmorrhage, and their nature is often obvious at operation. This is true of spontaneous ruptures of the spleen (Baily 1929–30), and liver (Bruce 1929), rupture of the splenic vessels in cirrhosis of the liver (Pyrah and others 1929, Ogilvie 1922), oozing from the liver in toxic hepatitis (Peck 1905), and in undulant fever (Box and Bamforth 1925), and ruptured mycotic aneurysm in acute bacterial endocarditis (Willius 1935).

Besides these, two types of spontaneous hæmorrhage are of especial interest. In the first, the bleeding occurs from an arterio-sclerotic vessel, and the condition is generally and appropriately known as abdominal apoplexy. In the second, the source of the hæmorrhage and the underlying cause have not been discoverable at operation. It is on this latter type, especially, that the following cases are thought to have a bearing.

CASE 2.—The patient was an unemployed man 34 years old, of muscular build. For two days he had suffered from indefinite abdominal pain, and, six hours before admission, while standing at the doorway of the "close" in which he lived, he was seized with violent epigastric pain and with pain in the left shoulder. Both persisted in acute form. Nausea was experienced shortly after the pain began and he vomited within the hour. There were no other significant features in the history, but he did admit to suffering from chronic indigestion for an unspecified number of years.

When I examined him he was very restless and looked ill. He presented a curious plethoric or cyanotic appearance, and was very thirsty. The temperature was subnormal, the pulse-rate, to begin with, only 76. The tongue was dry and slightly furred. The abdomen appeared to be distended, and the respiratory excursion was limited. Palpation disclosed fairly generalised tenderness, and muscular rigidity was present in the epigastric area. The liver dullness was of normal extent; elsewhere percussion gave a rather dull note over the major part of the abdomen, and especially in the flanks. The other systems were not abnormal in any obvious way.

The diagnosis was somewhat in doubt, but was thought to lie between an acute pancreatitis—which was favoured by his rather cyanotic colour—and a leaking gastric ulcer, the abdominal rigidity, the shoulder pain, and the former history of digestive trouble seeming to support the latter. Operation was advised and carried out within an hour of admission, by which time the pulse-rate had risen considerably. The abdomen was opened by a right paramedian incision, and immediately the peritoneum was incised there was a gush of bright red fluid blood. A very large quantity of blood was thereafter evacuated, along with some large clots, and it was some time before the viscera could be adequately inspected. The stomach, duodenum, and pancreas were all normal. There was no rupture of the liver or spleen and no definite bleeding-point could be identified. The condition of the omentum and the mesocolon was noted at the time. Each contained several small discrete hæmatomata and appeared somewhat congested. The pelvis was investigated after the incision had been enlarged, again with negative results. Accordingly, a small rubber dam was left in situ and the wound closed.

In the days succeeding operation an attempt was made to identify the presence of any blood dyscrasia, but the Wassermann test was negative, the blood counts within the limits of normality, and the differential blood count normal. The coagulation time and the platelet count also gave the usual readings. His progress was interesting. For the first six days vomiting was frequent; he could retain nothing by mouth. After that he improved markedly; the vomiting stopped and he had a very

good appetite. In two weeks there was an intermittent pyrexia, due probably to the absorption of the intraperitoneal blood; thereafter the temperature settled and his further recovery was uneventful. Seen at intervals since, he has remained well and has had no further abdominal trouble of any kind.

I have been able to trace only one exactly comparable case, previously reported in this journal by Hartley and MacKechnie (1934).

Their patient was a labourer, aged 31, who experienced, on rising in the morning, a sharp pain in the left upper abdomen, which was relieved by vomiting. Some hours later the pain recurred and he was admitted to hospital, where his condition became so rapidly worse that laparotomy was decided upon. The operation findings are of great interest: there was a considerable quantity of blood in the peritoneal cavity, and the omentum showed a series of discrete hæmatomata in its substance. The patient did not survive many hours, and autopsy confirmed the operative findings in that no definite source of the hæmorrhage could be found.

Hartley and MacKechnie suggested, somewhat provocatively, that the condition be called "splanchnostaxis."

A case of Churchman's (1911), though not exactly comparable, has certain points of similarity.

His patient was a man of 48 who for some years had suffered from constipation, with dull abdominal pain, and who finally came under his care with acute abdominal symptoms suggesting acute appendicitis. Shifting dullness was present in the flanks, and it was accordingly assumed that peritonitis had supervened. Operation revealed only intraperitoneal hæmorrhage, and the patient died in three hours. At autopsy there was a hæmatoma in the rectal wall, and some ecchymosis in the neighbourhood of the pylorus and at other points in the small intestine. The bowel wall, on section, showed dilatation of the subserous vessels and intramural hæmorrhage.

Churchman regarded these findings as in keeping with hæmophilia, largely because intraperitoneal and intrapleural hæmorrhages are known to occur in fatal cases of this disease and in experimentally produced "hæmorrhagic disease" (Whipple and Sperry 1909). This suggestion has not altogether been accepted, and indeed Osler and McCrae (1925) regard Churchman's case as an acute form of "hæmorrhagic peritonitis," of which disease they also recognise a chronic variety, analogous to the hæmorrhagic pachymeningitis described by Virchow. The chronic form is localised most commonly to the pelvis, and its pathological manifestations take the form of the deposit on the surface of the peritoneum of successive layers of young connective tissue, containing numerous large wide vessels, from which repeated hæmorrhages take place.

In my own case, and in the case of Hartley and MacKechnie, the possibility of a hæmophilic or a hæmorrhagic peritonitic cause was quite definitely excluded, and in view of the complete recovery on the one hand, and the absence of demonstrable visceral or peritoneal post-mortem pathology on the other, it is necessary to fall back on a vascular disturbance to explain the bleeding.

Spontaneous hæmorrhage from an arterio-sclerotic vessel is always a possibility in the abdomen as elsewhere. Nevertheless, considering the great frequency of arterio-sclerotic vascular degeneration, and the fairly common occurrence of gross visceral aneurysm, the spontaneous rupture of visceral and peripheral arteries is remarkably rare. The accident, indeed, has been reported only on six occasions:—

Hilliard (1918).—Male aged 48. Sudden onset of abdominal pain with rigidity. Laparotomy showed hæmorrhage, but definite bleeding-point not found. General arterio-sclerosis.

Starcke (1923).—Spontaneous rupture of the gastro-duodenal artery in a male, aged 60, with arterio-sclerosis.

Green and Powers (1931).—Sudden epigastric pain with rigidity, after spontaneous rupture of the left gastric artery, with a hæmatoma in the gastrohepatic omentum, in a female aged 54, with a history of hæmorrhages (nasal, ocular).

Buchbinder and Greene (1935).—Spontaneous rupture of a gastric artery in a male aged 57.

Moorehead and McLester (1936).—(1) Spontaneous hæmorrhage from junction of right and left gastrics, both vessels being severely diseased. (2) Spontaneous rupture of an aneurysm of the superior mesenteric artery. The respective ages were 44 and 50 years.

From a study of the recorded cases two facts emerge: (1) hypertension is an invariable accompaniment; (2) the age-incidence is between 44 and 60 (average 52). In only one case is there positive evidence of aneurysm formation, and on this account the next case which I am reporting is of interest. I am able to include it through the kindness of Mr. C. F. W. Illingworth, under whose care the patient was.

CASE 3.—For some days the patient, a man of 75, had complained of being slightly off colour. Before this he had had some difficulty in securing regular evacuation of the bowel, and had required a daily aperient. On the day of admission he was seized with sudden pain in the upper abdomen, and for some hours this was attended by repeated vomiting of food material. When examined after admission he was found to have a subnormal temperature and a feeble rapid pulse. His tongue was dry and furred and he looked ill. Investigation of his abdominal condition revealed a prominent, ballooned, and tender cæcum; the tenderness was continued over the whole distribution of the colon, but there was no rigidity, and no swelling could be detected. There was dullness in both flanks, and a diagnosis of acute obstruction supervening on a chronic malignant obstruction was made.

At operation a massive intraperitoneal hæmorrhage was disclosed; a swelling could be discovered on palpation, apparently in relation to the aorta, and was taken to be an aneurysm, and the abdomen was closed without drainage. The patient died a week later from bronchopneumonia, and post-mortem examination showed an extravasation of blood in the general peritoneal cavity and in the transverse mesocolon. An aneurysmal dilatation was present on the middle colic artery and was the source of the hæmorrhage. The abdominal vessels were normal, and the aorta itself showed only slight atheromatous changes, with some degree of thickening of the aortic valves.

At first sight it seems most likely that the aneurysm in this case was secondary to arterio-sclerotic vascular degeneration; yet the remainder of the abdominal vasculature was healthy. It is a fact nevertheless that abdominal aneurysm can occur in the absence of degenerative changes in the arterial wall, for Budde (1925) has recorded a case of fatal rupture of an aneurysm of the left gastro-epiploic artery in a man of 27, without evidence of arterio-sclerosis.

In view of these findings it seems impossible to exclude as a possible cause of these aneurysms a congenital weakness of the vessel wall akin to that which leads to aneurysm of the basal cerebral arteries. Forbus (1930), in his classical account of congenital aneurysms, has shown that they tend to form at the points of branching of the arterial tree, and their occurrence is favoured by the special mode of formation of the arteries. In the development of an artery the larger trunks acquire a muscular coat, while their smaller branches remain for [illegible]me as simple endothelial tubes. Later on the branches acquire muscular coats, not as outgrowths from the muscle of the parent vessel but as independent

developments in situ from the surrounding undifferentiated mesenchyme. At the line of junction between branch and trunk the respective muscular coats meet, and should fuse solidly. It is in an imperfection of the latter process that the explanation of the aneurysm lies, for the persistence of a gap or the occurrence of a "weak joint" creates a *locus minoris resistentiæ*, at which "blowing out," with the production of aneurysm, may occur.

The rupture of a congenital aneurysm has attracted most attention when the intracranial vessels are involved. Forbus himself has drawn attention to the possibility of a similar accident in relation to other vessels; and indeed his views of the origin of the lesion were based on his studies of the development not of the intracranial vessels but of the mesenteric vessels. Reports of multiple miliary aneurysms of this nature in the coronary and mesenteric vessels have been made by Eppinger (1887) and by Gee (1871), and in relation to the pulmonary vessels by Wilkins (1917), and the renal arteries by Forbus (1930).

While it is impossible to be dogmatic about the third case, the probabilities favour such an explanation in the case of Budde; in the cases of Hartley and MacKechnie, and in my own, it seems, in view of the comparatively early age and the other considerations, that the hæmorrhage may well have originated in a miliary aneurysm, or in a spontaneous rupture at one of the numerous junctional areas on the mesenteric arterial tree, and in these two cases the clinical course offers a similar contrast to that of the massive or apoplectic type of rupture, and of the "leak" in the basal cerebral aneurysm. The premise unfortunately cannot be held to be proved, but the suggestion is made here in the hope that it may lead to more detailed investigation if similar cases are encountered by others.

It may also be of interest to record the mode and results of treatment in hæmoperitoneum from vascular causes, as illustrated by the cases I have reviewed. In the arterio-sclerotic cases ligation of the bleeding vessel was undertaken and has always proved successful, whereas in cases where the bleeding-point was not definitely established, and where no treatment was carried out, the patient died. Both cases of established aneurysm were fatal, but in one of the two cases in which definite aneurysm was not found the patient recovered.

CONCLUSIONS

In the female the likeliest source of spontaneous hæmoperitoneum is the pelvic viscera, especially the ovary and tube. In the male the most common source is one of the mesenteric vessels, and a systematic search for the bleeding-point should be made, since ligation greatly increases the chances of survival.

I am indebted to Sir John Fraser for the opportunity of treating the first two cases and for permission to record them. I am also grateful to Mr. Illingworth for permission to refer to his case.

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DIAPHYSECTOMY IN ACUTE OSTEOMYELITIS*

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LOWER death-rates for acute osteomyelitis have been recorded by those who prefer conservative and limited measures to the old "gutter" operation (Holman 1934, Tyrrell Gray 1934, Greene 1934). This paper must not be misconstrued as an appeal for radical treatment. Since the disease is a systemic infection followed by a local lesion, death that in the acute stage is due to septicæmia or pyæmia will not be prevented by guttering, shaft resection, or amputation: such measures indeed increase the burdens of a critically ill patient. When the local lesion predominates, suppuration in the metaphysis spreads outwards to form a subperiosteal abscess; this sequence usually precedes a true myelitis. In children and especially in infants extensive stripping of the periosteum may not cause necrosis, so adequate is the blood-supply from the nutrient vessels. Exceptionally, early medullary infection coincides with the periosteal abscess, but more usually myelitis develops later as an inward spread along the Volkmann's canals from the subperiosteal abscess, rather than as a direct extension from the metaphyseal pus (Starr 1922).

CRITICISM OF THE GUTTER OPERATION

It is difficult to believe that the gravity of acute osteomyelitis depends upon the rigidity of bone, firstly because of the ease with which pus finds its way into the subperiosteal space, and secondly because in children the disease though arising within more porous bone—because of its greater vascularity—is far graver than in adults. It is more reasonable to ascribe the serious signs and symptoms of juvenile osteomyelitis to rapid absorption of toxins from the marrow, for the blood-vessels in growing shafts are arranged in sinusoidal form to enable blood-cells—and hence bacteria—to gain ready access to the general blood stream. Such blood spaces are not found in adult bones.

Sound treatment, as in the case of cellulitis, avoids operation until there is a subperiosteal abscess. At the first operation incision of this suffices; rest to the patient and complete immobilisation of the affected limb, preferably in plaster, follow. If at operation the bone is bleeding there is no need to

* This paper is based upon a section of a thesis presented for the degree of Ch.M. of the University of Birmingham.

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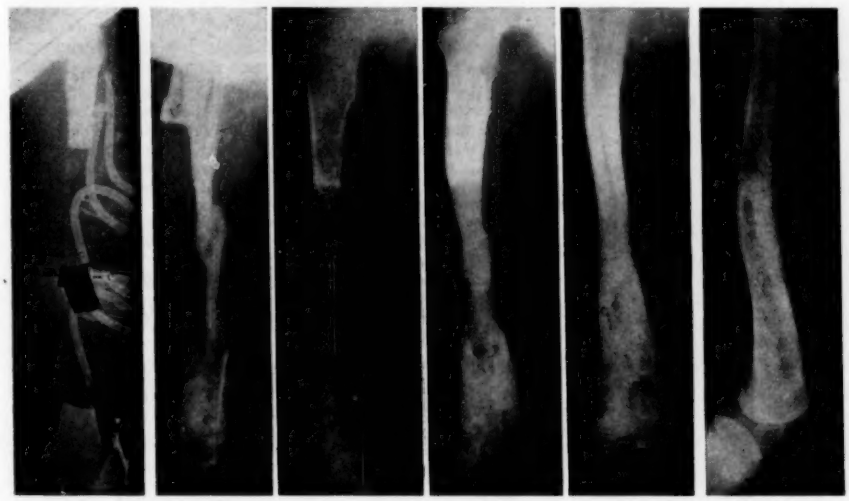

FIG. 1 (Case 2).—Left: radiogram 16 days after partial diaphysectomy of femur; new bone is already being laid down; the wound is being irrigated through Carrel-Dakin tubes. Centre: radiograms at intervals during the nine months after the operation; the new shaft is completely re-formed. Right: radiogram two years after operation; there is no deformity except for a little backward bowing.

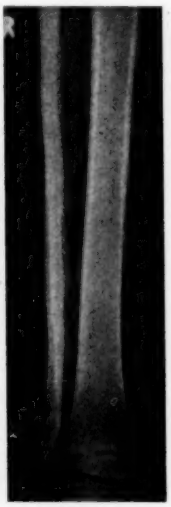

FIG. 4 (Case 4).—Radiogram seven months after complete diaphysectomy of the fibula.

drill or trephine since this sign indicates a healthy marrow and the absence of myelitis; usually the evacuation of the subperiosteal abscess will prevent marrow involvement. The gutter operation would only expose further bone to infection, while it adds the risk of sequestrum formation. If however the bone does not bleed even after drilling, extensive

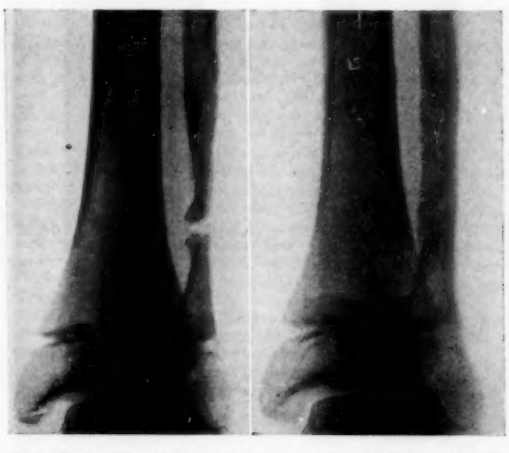

FIG. 3.—(Case 3).—Left: radiogram five months after diaphysectomy, showing an apparent pseudo-arthrosis. Right: complete regeneration of fibula in eight months.

guttering will not save it, for its blood-supply has already gone, nor will it provide adequate drainage, for the pus lies mainly without and not within the shaft; while sequestrum formation will not be prevented by so incomplete a removal if the shaft is necrosed. In such conditions shaft resection is superior to the gutter operation and may replace amputation.

INDICATIONS FOR DIAPHYSECTOMY

Successful shaft resection by removing the diseased area diminishes, though does not always prevent, sequestration, and gives splendid drainage to the subperiosteal space. The risk of non-regeneration in children has been exaggerated; it can be prevented by care in the selection of cases (to be described later), in the technique, and in the after treatment, where adequate and prolonged immobilisation is essential. The operation is unjustifiable in patients over 16, for regeneration is too uncertain in adult shafts, or in infants, when the most extensive periosteal

FIG. 2 (Case 3).—Portion of fibula removed.

stripping may not cause necrosis. In the fibula it is the operation of choice even to the exclusion of simple drainage, for non-regeneration is rare and does not prevent a good functional result and rapid healing.

CHOICE OF PATIENTS

Apart from osteomyelitis of the fibula, resection is unjustifiable until simple periosteal incision, combined sometimes with metaphyseal drainage and followed by plaster case immobilisation, has been tried. If the temperature persists after four days the wound is reopened and any abscesses drained. If, however, the periosteum is widely stripped the shaft is drilled by the technique described by Fraser (1934). If no bleeding follows, the shaft is dead or occupied by pus and will form a large sequestrum;

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FIG. 6 (Case 5).—Radiogram a year after operation showing incomplete regeneration with pseudo-arthrosis.

FIG. 7 (Case 6).—Abscess cavity in the centre of a shaft which shows chronic osteomyelitis.

it should therefore be removed in preference to futile guttering. As already said, resection in the presence of an adherent periosteum is unjustifiable, for revascularisation of the shaft may follow.

THE CASE AGAINST DIAPHYSECTOMY

Greig (1933) correctly says that bone is at the mercy of its blood-supply, being decalcified by the hyperæmia of infection. In acute osteomyelitis the liberated calcium is redeposited within the periosteum to form the new involucrum and failure

FIG. 5 (Case 5).—Wound after partial diaphysectomy of fibula.

of bone regeneration is to be expected after diaphysectomy as the available calcium is removed; he says the shaft should not be removed until new bone is well developed. Since dead and avascular bone does not readily yield its calcium the argument loses force, and even in the absence of a shaft the inflamed periosteum, already rich in calcium and osteogenic properties, rapidly lays down new bone.

Clinical Experience in Seven Patients

No account is given of the operation in the phalanges, metacarpals, or metatarsals, but here I have seen successful results. In all instances diaphysectomy has been done before an involucrum had formed.

CLAVICLE

In my first patient, complete bone regeneration followed resection of an entire clavicle after periosteal incision and bone drainage had failed (d'Abreu, 1933).

CASE 1.—In a boy of 14 with acute osteomyelitis of the outer end of the clavicle, a subperiosteal abscess—containing staphylococci—was opened. The temperature fell, but three days later the length of the clavicle was exquisitely tender. I operated again, found pus under the whole length of the periosteum, and performed complete diaphysectomy. Ten days later a large mass of callus was palpable. The patient, who had been immobilised with a long sand pillow between the scapulæ, was then allowed to use the arm freely. A radiogram taken 22 days after the diaphysectomy showed a massive bone deposition. Five weeks after the operation the function of the upper limb was normal. Palpation revealed a normally outlined clavicle.

FEMUR

The second case is one of acute osteomyelitis of the femur with diaphysectomy followed by recovery and bone regeneration. (I am indebted to Mr. Geoffrey Keynes for permission to include this patient upon whom he operated.)

CASE 2.—A boy, aged 6, was admitted to St. Bartholomew's Hospital with acute osteomyelitis of the lower end of the right femur; at 10 o'clock on the morning of admission the lower end of the femur was exposed and a subperiosteal abscess drained, but as at 7 P.M. on the same day he remained critically ill, a second operation was performed. To save amputation most of the shaft of the femur was resected subperiosteally and a

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FIG. 8 (Case 7).—Resected portion of shaft. Note the drill-holes through which pus was located at the second operation, and the original window drainage of the metaphysis.

FIG. 9 (Case 7).—Lateral radiogram of the regenerated tibia.

blood transfusion given; the wound was left widely open and irrigated by the Carrel-Dakin method; the pus contained staphylococci. The limb was carefully splinted with extension maintained by skin strapping.

Progress.—Sixteen days after the operation measurement of both lower limbs did not detect any shortening or lengthening. A radiogram taken on that day showed

that new bone was being laid down (Fig. 1). The extension was maintained for eight weeks; at this stage on measurement the affected lower limb was 1 cm. longer than the normal side; a radiogram showed good alignment and a newly formed shaft. Progress was extremely satisfactory although small sequestra had to be removed on three occasions, a ring sequestrum being removed six months after operation, one a year after diaphysectomy, and the last a year and two months after the first admission.

Result.—He was seen in July, 1929, when the wound was soundly healed and again in 1932 when he was a well-developed boy with a sound femur. Radiograms taken over a period of nine months after operation showed excellent bone regeneration (Fig. 1).

Comments.—In the bone apparently most unsuitable for diaphysectomy owing to its massiveness, its importance in weight bearing and lack of a companion bone, an excellent result can be obtained; great care in maintaining accurate extension and guarding against backward bowing prevented deformity. The operation was an excellent substitute for amputation, giving adequate drainage in a critically ill child. Diaphysectomy should have no place in the routine treatment of osteomyelitis of the femur; but if after periosteal incision and drainage of the metaphysis has failed, resection of an avascular shaft is preferable to extensive guttering or amputation. Rankin (1927) has published some splendid results in the femur after resection.

FIBULA

There is no safer or more humane treatment of acute osteomyelitis of the fibula than early excision of the affected bone, and primary union of the wound may follow (see Fig. 5).

CASE 3.—A boy, aged 12, provided a typical example. He had severe pain over the lower end of the left fibula for five days before coming to hospital. On the day before admission there had been a rigor. There was a brawny red swelling over the fibula at its lower part.

Operation.—Through an incision over the lower third of the bone, the peroneal muscles were displaced laterally and posteriorly; pus was found between the periosteum and the bone for a distance of 2½ in. The bone was divided 3 in. above the epiphyseal cartilage and the lower portion of the diaphysis avulsed; it separated easily from the epiphyseal cartilage which was left behind and intact (Fig. 2). The wound was lightly packed with vaseline and the limb immobilised on a splint.

Progress.—On the 10th day the wound was healthy; a light plaster case having been applied he was discharged well and free from pain; the wound was completely healed within four weeks of the operation. He was allowed to walk three weeks after the operation, the light plaster being discarded six weeks after admission.

Result.—A radiogram taken 19 days after the resection showed new bone. Six months later the shaft was almost completely re-formed, but there was an appearance suggesting a pseudo-arthrosis (Fig. 3). The gap, however, disappeared and the bone regenerated completely (Fig. 3).

CASE 4.—In a girl of 9, although regeneration was quite satisfactory after an extensive diaphysectomy (Fig. 4.), it was feared that since for some weeks she could not extend the big toe, the external popliteal nerve had been injured at the operation, but she recovered so rapidly that it was probably due to temporary removal of the origin of the extensor hallucis proprius. As the bone regenerated so the power of extension returned. The wound has remained soundly healed since operation.

Incomplete regeneration.—Although this was seen once there was no loss of function; this was in a boy of 11 (Case 5).

At operation pus was found subcutaneously and had burst through the periosteum which was found to be lifted from the bone; the lower quarter of the fibula was removed and avulsed from the epiphyseal plate. The wound was wiped out with flavine and lightly closed. Progress was entirely satisfactory and the wound healed almost by the first intention, the boy being discharged 13 days after peration and allowed to walk (Fig. 5). Bone regenerated imperfectly, slowly, and irregularly. An ominous gap existed two months after the operation. This gap, though diminished, still existed six months later. A radiogram taken a year after the operation showed permanent non-union (Fig. 6). Union is impossible without operation, but as there is no disability this is of course unjustifiable.

Incomplete regeneration is difficult to explain. Bisgard (1935) has shown that resection of periosteum successfully prevents bony regeneration, and at the operation on this boy I probably damaged a part of it. Lorthioir (1935) also comments on the necessity of preserving the integrity of the periosteum and refers to unsatisfactory results following its damage.

Adults.—Since non-regeneration is not satisfactory in adults diaphysectomy should not be carried out in these on any bone other than the fibula. The operation has been done once in an adult.

CASE 6.—A man, aged 25, complained of painful swelling in the mid-shaft of the left fibula. When he was 15 years of age he had severe pain in the leg for a week which was treated by hot fomentations until an abscess formed and broke; this abscess took six months to heal. After that he had several recurrences of pain and of discharge. There was a fluctuant swelling half-way down the fibular shaft, the whole length of which was enlarged. A radiogram showed a Brodie's abscess situated in the mid-shaft (Fig. 7).

Operation.—A subcutaneous abscess was opened and led down to greatly thickened bone; the portion of bone containing the abscess was removed and after the wound had been lightly packed with vaseline gauze, the leg was immobilised in a plaster case.

Result.—The wound healed well. There has been no bone regeneration but function is normal.

Comments.—In these cases of shaft resection of the fibula, the disease was rapidly arrested, sequestrum formation avoided and rapid healing obtained.

TIBIA

The following is a case of osteomyelitis of the tibia in which metaphyseal drainage was performed followed later by diaphysectomy. It resulted in regeneration with some sequestrum formation.

CASE 7.—A boy, aged 12, had had severe pain above the right ankle for some days; he was extremely ill, flushed, and restless with a temperature of 102° F., a pulse-rate of 112.

First operation.—The lower third of the subcutaneous surface of the tibia was exposed. On incising the periosteum only a little pus escaped, and a window of bone over the metaphysis was removed and pus was found; the marrow above the metaphysis was healthy and bled normally. The wound was lightly packed with vaseline gauze and the limb enclosed in a plaster case from above the knee-joint to the heads of the metatarsals.

Since the temperature and pulse-rate remained high and the boy was still ill, a second operation was performed (eight days later).

Second operation.—The plaster case was removed; the wound was extended upwards and pus was found under the periosteum reaching up to the proximal half of the tibia. The tibia was drilled in three places; from the lower two holes pus exuded, but healthy bleeding came from the highest bone puncture. Because of the extensive spread of pus both within and without the shaft, extensive necrosis appeared inevitable, and more than two-thirds were resected. The wide separation of the periosteum from the shaft made the use of a raspatory unnecessary. The bone separated easily from the lower epiphyseal cartilage (Fig. 8). To prevent collapse of the lengthy

periosteal tube, a glass rod was placed in its cavity. The wound was lightly packed with vaseline gauze and the limb encased in plaster.

Progress.—With the temperature and pulse-rate rapidly falling there was a marked improvement in the general condition. A radiogram taken 14 days after the operation showed new bone around the glass rod which was then removed under general anæsthesia. When the plaster had been removed the large wound looked healthy, the glass rod was lifted out and the whole limb again immobilised in plaster. The further progress was satisfactory, dressings being done at monthly intervals with the limb rigidly immobilised throughout in plaster. At the sixth dressing sequestra were removed from the upper and lower ends of the wound, the former being a ring sequestrum. At that time the shaft was well regenerated. The boy was discharged on Sept. 29th in a plaster to which was attached a Böhler's walking iron; the wound was not completely healed, but is now quite sound.

Result.—As seen on radiograms bone was being reformed as early as on the fourteenth day after the diaphysectomy. Two months after operation a new shaft had re-formed. The lower part at this stage was not so well regenerated as the upper. This deficiency coincided with a good deal of residual infection in that area and was no doubt due to the decalcifying effect of a local hyperæmia. Six months after diaphysectomy there was further bone formation to be seen on the radiogram. At this stage a sequestrum had appeared and was removed. Fig. 9 shows a lateral radiogram of the newly formed shaft; although a cavity is present this is symptomless.

Summary

Diaphysectomy is rarely required in the treatment of acute osteomyelitis since the results of conservative incision of a subperiosteal abscess are good when combined with general and local rest; in common with other radical measures it is unavailing when fulminating septicæmia overshadows the local lesion.

Extensive periosteal stripping does not imply certain necrosis, but when combined with true myelitis the shaft will largely die; in such patients resection diminishes sequestrum formation and provides splendid drainage of the pus in the periosteal tube. The gutter operation is unsound for it does not save sequestration nor provide adequate drainage; it is based on the faulty assumption that bone rigidity is the important factor in acute osteomyelitis. The theoretical objection that a valuable source of calcium is removed by diaphysectomy overlooks the inability of avascular bone to yield or acquire calcium. The operation is unjustifiable in infants and in adults, the optimum age being from 6–16. The procedure, except in the fibula where it is the operation of choice, must not be adopted until simple periosteal and metaphyseal drainage have failed and then only when there is certain proof of myelitis. An adherent periosteum requiring instrumental separation contra-indicates resection.

The results in seven patients have been satisfactory. The epiphysis must be conserved and the resection need not proceed 1 inch beyond the affected portion of the shaft. The periosteum must be meticulously preserved from damage and adequate immobilisation provided.

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MEDIASTINAL GANGLIO-NEUROBLASTOMA

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IN 1870 Loretz discovered a tumour containing well-differentiated ganglion cells, and so established the occurrence of neoplasms to which the term ganglioneuroma was applied. Later, as a result of further study of such tumours and increased knowledge of the anatomy and development of the sympathetic nervous system, tumours were recognised which were composed of undifferentiated sympathetic formative cells. Such tumours are now called neuroblastomata. In between these two extremes (benign and actively malignant) all degrees of intermediate tumours were found, and Landau (1912) and von Fischer (1922) have classified them under a variety of different headings. Such tumours, although commonly arising from undifferentiated sympathetic tissue in the region of the adrenal medulla, may also arise elsewhere from sympathetic nerve tissue in the abdomen, thorax, brain, cranial and peripheral nerves, and elsewhere. The neuroblastoma is well recognised, and descriptions of the Pepper and Hutchison types can be found in all comprehensive text-books of pædiatrics. The ganglioneuroma is uncommon, but is carefully described. The intermediate forms are rare, and so little attention has been given to them in this country that the present case is thought worthy of detailed description.

CASE REPORT

A boy, aged 6, was admitted to hospital on Jan. 25th, 1937, complaining of pain in the abdomen on and off for one week, pain in both knees and the left side of the face for one week, and small glands in the neck, painless and discrete, for four weeks. Previously he had been unwell for about a month. There had been no definite tonsillar infection noted. The pain in the knees was not acute but was made worse by movement. He had failed to gain weight for four months before admission. There was no history of cough, fever, or acute systemic upset. He had slept well, remained fairly cheerful, and had a normal appetite until one week before admission. He had had measles and chicken-pox over a year ago.

Examination.—Temperature 102·7° F.; pulse-rate 124; respiration-rate 26. A thin boy, somewhat flushed but quite cheerful. Small discrete glands very slightly tender both sides of the neck. Left tonsillar gland enlarged. Small shotty painless glands in both axillæ. Examination of cardiovascular and respiratory systems revealed nothing definitely abnormal. Abdomen: slight tenderness in both iliac fossæ, but no rigidity; liver and spleen not palpable. Joints: slight pain experienced on moving both knees, also left hip; otherwise no apparent abnormality. Central nervous system normal; no rash. Blood: white cells, 8000 per c.mm. (polymorphs 54 per cent., lymphocytes 40 per cent., mononuclears 6 per cent.); no abnormal red or white cells seen. Mantoux: negative 1 in 10,000, 1 in 1000, and 1 in 100.

Progress.—The temperature came down to normal in four days but occasionally rose to 99°–100°. Pulse- and respiration-rates also fell correspondingly. On Feb. 16th temperature rose to 100·4°. Pains in the neck. Glands much as before, but slightly more tender. Throat normal. Blood: white cells, 6000 per c.mm. (polymorphs 60 per cent., lymphocytes 32 per cent., mononuclears 7 per cent., basophils 1 per cent.); 4 myelocytes and 2 normoblasts per 200 white cells. Sedimentation-rate

53 mm. in 1 hour (microscopical method). The urine presented no abnormalities. The temperature had settled by Feb. 22nd, when a radiogram showed an oval mass behind the heart, alongside the vertebral column in the posterior mediastinum (Fig. 1). Feb. 25th: blood picture as before; general condition improved.

On March 6th he was very restless, with acute pain in the left knee. Movements free and painless at the knee, but much pain experienced on attempting to move the left hip, where the muscles were in spasm. Adduction, abduction, and flexion all equally painful. Nothing abnormal noted in the spine. Spleen not palpable. Left leg was put in extension. He rapidly improved but an intermittent pyrexia persisted. Temperature 100·2°. Pulse-rate 150. Later (March 12th) he had acute pain in the other hip with similar findings.

Operation by Mr. F. D. Saner under general anæsthesia, March 18th. Left side of chest explored with a needle. No fluid found but some resistance offered to the needle. A portion of the ninth rib was removed and an encapsulated tumour removed without difficulty from the posterior mediastinum. It was extrapleural with no adhesions, bar

FIG. 2.—The tumour cut in half, showing the pale outer ganlioneuromatous part and the malignant inner core of neuroblastomatous tissue.

a few loose connexions to the surrounding structures. It was lying alongside the vertebral bodies opposite thoracic vertebræ 7–11. There were no definite connexions at its lower pole.

Pathology.—The tumour was encapsulated, with a firm yellow-white "cortex" and a red "medulla" which in places came near the surface; irregular in shape, 2½ in. long, 1¾ in. wide, 1½ in. thick (Fig. 2). Paraffin sections were prepared from the solid outer portion of the tumour and from the adjacent hæmorrhagic area. The stains used were Ehrlich's hæmatoxylin, Anderson's iron hæmatoxylin, and eosin and van Giesen as counterstains. The outer portion of the growth shows a groundwork of very fine longitudinal fibrils accompanied by flattened nuclei running in the same direction. This tissue is arranged in rather ill-defined bundles with loose connective tissue between them. Somewhat sparsely scattered throughout there are collections of pale staining cells without any definite arrangement (Fig. 3). Some of these cells are very large, others quite small, and there are many intermediate forms. These features are characteristic of a ganglioneuroma and it may be noted that the resemblance to sections of sympathetic nerve ganglia is striking, though of course the histological picture is not absolutely identical.

The central portion of the tumour shows an active neoplastic process, accompanied by hæmorrhage and necrosis. The growth consists of deeply staining cells arranged in masses of varying size (Fig. 4). The cells themselves are small and rounded and contain very little cytoplasm; they vary somewhat in size and shape and on careful search all stages between the small undifferentiated cell and the large pale ganglionic cell can be found. In addition, rosette forms consisting of small deeply staining cells arranged peripherally around a fine fibrillar stroma are well shown (Fig. 5). The tumour, therefore, shows features of both neuroblastoma and ganglioneuroma and is best described as ganglioneuroblastoma.

FIG. 1.—Radiogram (antero-posterior) showing mass in mediastinum partly obscured by shadow of heart.

Further progress.—On March 23rd he was recovering from the operation. Pale. A blood count showed: hæmoglobin, 45 per cent.; red cells, 2,600,000; colour-index, 0·9; reticulocytes, 3 per cent.; white cells, 7000 (polymorphs 60 per cent., lymphocytes 29 per cent., mononuclears 6 per cent., eosinophils 4 per cent., basophils 1 per cent.); 4 megaloblasts, 1 normoblast, 3 myelocytes, and ? 1 myeloblast per 200 white cells; many hypochromic red cells; some anisocytosis and polychromasia.

May 3rd: the child is still anæmic, but is cheerful, happy, and free from pain. He has latterly been allowed up and walks well. He occasionally gets slight pain in the left knee as before. His hæmoglobin, 65 per cent. on April 23rd, is now 55 per cent. His red cells had risen as high as 4 millions per c.mm., but have now dropped to 3·3 millions. His colour-index has varied from 1 to 0·7. Immature red and white cells persist as before. Radiography has shown nothing abnormal in the hips or spine. It was thought his spleen could be felt following the

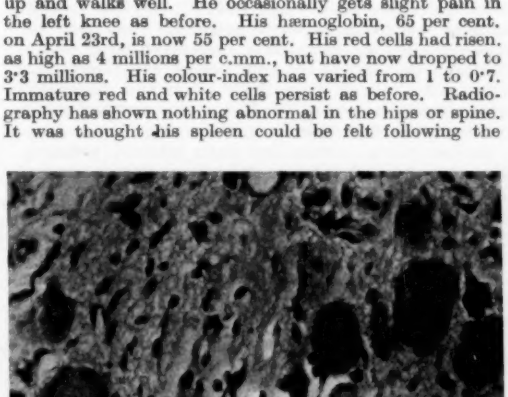

FIG. 3.—Outer part of tumour. Section shows large cells resembling those of ganglioneuroma. (× 380.)

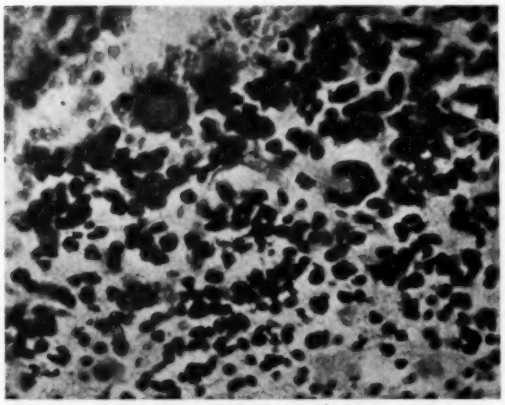

FIG. 4.—Central part of tumour showing large pale preganglionic cell and small deeply staining undifferentiated cells. (× 380.)

transfusion, but at no other time. The glands on the right side of his neck are definitely larger now. His central nervous system seems normal. A histamine test-meal reveals no abnormality. His temperature occasionally rises and falls over an 8–18 day period (Fig. 6) and is normal between, with occasional rise in the evening to 99°–99·7°.

Other treatment.—He has had one blood transfusion, and is having a liver extract and iron.

DISCUSSION

The case is of interest because, although the tumour is malignant, histologically and clinically, it comes half-way between the benign true ganglioneuroma and the highly malignant neuroblastoma, and corresponds to the ganglio-neuroblastoma of Robertson (1915) or the neuroblastoma gangliocellulare of von Fischer. In the section the cells of different stages of development are well seen, small round cells resembling small lymphocytes, larger cells resembling large lymphocytes with vesicular nuclei, and even larger cells running up to immature ganglion cells. These cell types correspond to the sympathogonia and sympathoblasts described by Wright (1910). Such a tumour is usually discovered later than the highly malignant completely undifferentiated neuroblastoma, and sooner than the benign ganglioneuroma which may, indeed, be entirely silent and discovered unexpectedly at autopsy. Metastases occur, but the whole picture is a slower, gradual one.

In this case metastases have almost certainly occurred. The X ray appearance suggests a cord of tissue running to the region of the left adrenal. Pains in the lower limbs were noted in some of the cases described by Frew (1911), and Stout (1924) described a case of a child, aged 2½, who complained of weakness in the legs. Death followed attempts to remove a left-sided adrenal ganglio-neuroblastoma, and an ingrowth was found passing from the tumour through the intervertebral foramen to cause compression of the cord. The leg pains in the case described here may be due to a similar cause.

The anæmia is of interest. It differs from the simple microcytic anæmia usually described in such cases in having many immature red and white cells in the circulation and many large red cells. The colour-index has varied from 0·7 to 1. It appears to be a leuco-erythroblastic anæmia, possibly due to secondary deposits in bone. In view of the potential malignancy of these tumours, even the more benign form, early removal is indicated. Even so, the prognosis is bad in this case.

The radiological findings allowed an early diagnosis to be made. In a straight antero-posterior view

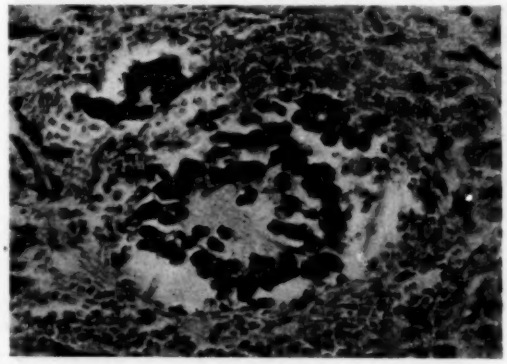

FIG. 5.—Cells arranged in rosette form. (× 380.)

nothing was seen at the normal density as the tumour was hidden behind the heart. An oblique view, however, revealed it, and lateral and hard antero-posterior pictures revealed the true extent and size of the mass. Such a large mass, however, gave no definite physical signs, and the X ray reports came as a surprise. There is no radiological evidence of metastases in the bones, but the glands in his neck are increasing in number and size, and it is likely that they are secondary to a lymphatic spread.

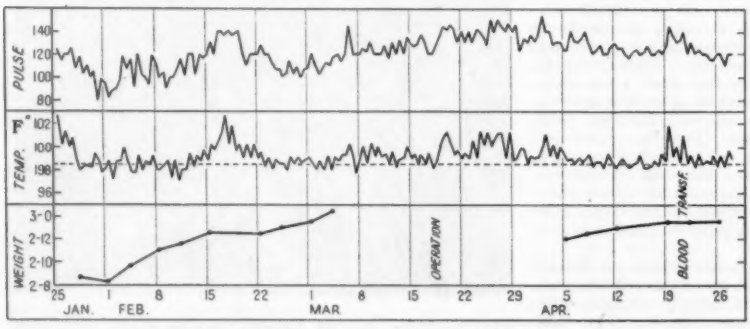

FIG. 6.—Pulse, temperature, and weight chart.

Our thanks are due to Dr. Bernard Schlesinger for his permission to publish this case and for the great help he has given us.

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CLINICAL AND LABORATORY NOTES

PANCREATIC CANCER WITH DIABETES

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CANCER of the pancreas and diabetes mellitus are common diseases in medical practice, but it is rare to meet both in the same patient. The usual sequence is for the cancer to supervene on the diabetes; for clearly there is no reason to think that a diabetic is any less liable to develop cancer of the pancreas than an ordinary person. In the patient whose history is given below this order was reversed and the diabetic state was the result of the pancreatic neoplasm.

Malignant disease of the pancreas most often affects the head and/or body of the gland, leaving the tail, which contains the greater part of the islet tissue, uninvaded until a very late stage. Hence the symptoms are the outward expression of biliary and pancreatic obstruction and not of disturbed carbohydrate metabolism. A neoplasm commencing in the tail of the pancreas would not be likely to give rise to any obstructive signs or symptoms, but rather would show itself by an upset in the carbohydrate balance.

The frequency of carcinoma of the tail of the pancreas is about one-thirtieth that of the rest of the gland. Ewing (1928) collected 358 cases of cancer of the pancreas and in 12 of these the disease was primarily confined to the tail. Futcher (quoted by Osler) recorded 58 cases of pancreatic new growth among 42,000 admissions to the Johns Hopkins Hospital, the diagnosis being confirmed in 31 cases at autopsy. On this basis one would expect one case of cancer of the tail of the pancreas in about 30,000 hospital admissions.

CASE-HISTORY

The patient was a printer aged 58. For three or four months before entering hospital he had been working in another town some distance from his home. During this time he noticed increasing lassitude, followed later by a sense of complete exhaustion. He said that at the beginning of this period he had had slight swelling of the legs lasting for a few days. For six weeks his thirst had greatly increased and he had suffered from severe polyuria. His appetite was very poor and he had lost weight. For the last month he had noticed that he had a small swelling in the left side of his neck and that his voice had become hoarse. He gave a history of pneumonia and pleurisy four years before.

His nutrition was very poor; he had that laxity of the skin which follows intense dehydration and loss of weight. There was no icterus of the skin or conjunctivæ, no œdema of the ankles, and moderate clubbing of the fingers. There was no smell of acetone in his breath. His pulse-rate was raised (100 per minute), but his temperature and respiratory rate were normal. He had a small ovoid swelling in the left lobe of the thyroid, which had caused a slight deviation of the trachea to the opposite side. His peripheral arteries were moderately sclerotic. No abnormal physical signs were made out on systematic examination. A specimen of his urine freely reduced Fehling's solution, but contained no acetone or diacetic acid. A quantitative analysis the following day showed 2·5 per cent. of glucose and a later examination 3·3 per cent. The fasting blood-sugar was 250 mg. per 100 c.cm. on the day after admission.

Sputum examination was negative for tubercle bacilli and X ray films of the chest revealed no abnormality. Unfortunately he was not well enough to submit to a laryngoscopy. He was put on to a diet of milk, 7 oz. four-hourly, with water ad lib. No insulin was given. His lack of appetite and poor general condition prevented the addition of solid food to the diet. He was entirely confined to bed. Soon after entering hospital he complained of abdominal pains which were not severe at first but later increased in intensity. Nothing apart from slight generalised abdominal tenderness could be found to account for them. His bowels were acting normally. On the seventh night after admission he was kept awake by an intolerable desire to have a bowel action. In the early hours he called for a bed-pan, suddenly began to sweat, collapsed, and died.

An *autopsy* was performed the same day. A large mass, the size of a grape-fruit, occupied the site of the tail of the pancreas; the head and body were not involved. The left lateral portion of the tumour was necrotic and a loculated cavity had been formed by adhesions between it, the splenic flexure of the colon, and a portion of the peritoneum of the lesser sac. The cavity was filled with old and recent blood clot. The left kidney had two small secondary deposits beneath the capsule. The liver was normal and there was no biliary obstruction. The thyroid was enlarged mainly on the left side due to secondary metastases. The larynx was normal in appearance. The lungs were œdematous, and the heart showed some degree of myocardial degeneration.

Microscopic sections of the primary growth and of the secondary deposits in the kidney and thyroid showed the same characters. Dr. Osborn's report was: "The histological appearances are typical of the more embryonic type of carcinoma of the pancreas, having a superficial resemblance to lymphosarcoma. The cancer cells are small, darkly staining, with little cytoplasm, and arranged loosely in masses." The islets in the adjoining portion of pancreatic tissue seemed normal in structure.

HISTORICAL SURVEY

Gerard, Kissel, and Pêtry (1932) record a case of moderately severe diabetes with pancreatic deficiency in a male aged 45. At autopsy the pancreas was one mass of growth and metastases were present in the liver, left kidney, colon, and mesocolon. Urmy, Jones, and Wood (1931) describe a case of diabetes with fatty diarrhœa due to carcinoma of the pancreas. Velazquez (1932) records another case of pancreatic diabetes complicating cancer of the head of the pancreas.

The frequency of cancer of the pancreas in diabetics was studied by Marble (1934), who followed the after-histories of 1000 diabetics. Of these, 256 died of cancer—in 35 cases from cancer of the pancreas (21 were confirmed at necropsy). No case was found in which the head was not involved. In 4 cases the whole gland was affected, but the tail to a less extent than any other part. In every case the neoplasm supervened on the diabetes.

Gibbs and Logan (1929) reported the results of 147 autopsies on diabetic patients. No mention is made of growth being found in the pancreas on any occasion. Incidentally, they found apparently normal islets present in 11 cases.

SUMMARY

A case of diabetes mellitus and carcinoma of the tail of the pancreas is reported. The history and findings at autopsy make it clear that the diabetes was the result of the pancreatic new growth. Unfortunately the patient's condition did not allow

us to perform a glucose-tolerance test, which might have produced an interesting curve.

We feel impelled to publish this case, not only because of its rarity, but also to stimulate interest in the collection of further post-mortem evidence in diabetes mellitus, a disease whose ætiology from a pathological point of view is still incompletely worked out.

I greatly regret that owing to the untimely death of Dr. Osborn it has been impossible to produce an adequate photomicrograph of the sections.—F. P.

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THE USE OF STENT COMPOSITION IN RADIUM TREATMENT OF CARCINOMA OF THE VAGINA AND URETHRA

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EXCISION of a carcinoma of the vagina or urethra is generally agreed to be a most unsatisfactory operation and one which can only be attempted in unusually early cases. The results of operative treatment have been so depressing that most gynæcologists now prefer to use radium, although the growth is not of a type which is usually very radiosensitive. In using interstitial radiation for a carcinoma of the vagina by inserting radium needles of suitable length into the growth the immediate difficulty is that only short needles can be used without a grave risk of penetrating the bladder, urethral canal, or rectum. An exception is when the carcinoma happens to be low on the posterior wall of the vagina; but this is rare and such cases are suitable for treatment by excision. Short needles inserted into vaginal growths almost always fall out even if the vagina is thoroughly plugged, and in the case of a carcinoma of or near the urethral orifice plugging is not feasible. Thus attempts have been made to secure the radium needles or the boxes containing the radium needles to the wall of the vagina or urethra by catgut sutures. This is technically not easy to do, as superficial sutures cut out of the tissues and deeply passed sutures may perforate the adjacent viscera thus accelerating fistula formation.

To avoid some of the above difficulties, I have used Stent's Dental Composition (Porro and Co., New Cavendish-street, London, W.1) in some six cases during the last three years. The wax composition is heated till it can be moulded to the length and size of the vagina—a small senile vagina takes about one of the tablets and a capacious vagina will require three. Having thus got an obturator which fits the vagina from the cervix to the urethra, the radium needles are embedded into that part of the surface of the obturator which will lie opposite to the growth—i.e., in the case of an epithelioma of the urinary orifice, the needles are inserted into the upper part of the external end of the obturator and may extend more to the left or right according as the spread of the growth is more to one side or the other. The whole obturator is then covered with a piece of rubber glove which is tied at both ends with thick thread; the ends of the threads are left long to facilitate removal of the obturator by traction on them. I have usually inserted 30 to 45 mg. of radium element according to the size of the growth and given a dose of about 1250 milligramme-hours which may be repeated. So far this dosage has not resulted in early fistula formation.

A self-retaining catheter is essential.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS AND PHARMACOLOGY

AT a meeting of this section on June 8th, with Dr. DOROTHY HARE, the president, in the chair, a paper on

Hyperthyroidism and the Thyrotropic Hormone of the Pituitary

was given by Dr. ARNOLD LOESER (Freiburg i. Br.). He said that in animals the typical symptoms of hyperthyroidism could be produced by administering thyroid hormone or by increasing the production and liberation of thyroid secretion by giving the thyrotropic hormone. After injection of the thyrotropic hormone into a young guinea-pig the thyroid showed definite changes: macroscopically it was enlarged and filled with blood; microscopically there was a decrease in the amount of stainable colloid, with growth of the acinus cells which became first cubical and then columnar; the lumen of the follicles became smaller and the picture resembled that of the human gland in Graves's disease. The changes could be observed in from 30 minutes to 12 hours after the injection and were also apparent when living thyroid tissue was treated with thyrotropic hormone in vitro. The hormone was therefore believed to act directly on the gland cells; it was inactive when given by mouth and could be separated from other anterior pituitary substances, the growth and gonadotropic hormones. The hormone was estimated by the changes induced in the thyroid and had been found to be present in very different amounts in the pituitary of different species. Estimated in Junkmann-Schoeller units per gramme the comparative figures were: ox, 250–500; sheep, about 1000; rat, 4000–8000; pig, 300; horse, 70; and man 150–1000. The content in human pituitary gland was greater in patients suffering from tuberculosis and allied chronic infections than in those with other pathological conditions. The histological changes in the thyroid gland were accompanied by a reduction of iodine content, whereas the iodine content of blood and urine increased; after treatment with thyrotropic hormone the metabolic rate was also raised in guinea-pigs and humans on the first day, but reached a maximum after 6–10 days; the glycogen content of the liver was lowered only after about four days, as it was after administration of thyroxine. Injection of thyrotropic hormone also caused hypertrophy of the adrenals and a fall in their vitamin-C content, increased appetite, loss of hair, loss in weight, tachycardia, changes in

the metabolism of the heart muscle, and finally the characteristic tremor seen in humans. These symptoms were not observed in thyroidectomised animals; on the other hand exophthalmos could be produced in the absence of the thyroid, and Marine and Rosen therefore thought that the thyrotropic hormone irritated certain centres in the mid-brain which controlled the sympathetic nerve to the eye.

Many observers had been unable to maintain the high rate of production and excretion of thyroid hormone in normal animals; in fact all the changes, except exophthalmos, retrogressed to normal or even subnormal even though the administration of thyrotropic hormone was continued; lethal thyrotoxicosis was not produced, apparently because the thyroid became refractory to the hormone. Loeb in America had attributed this to an inhibitory action of the thyroid hormone acting on the thyroid to prevent further action of the stimulator; certainly the simultaneous administration of thyroid substance reduced the effect of the pituitary hormone, but according to Kuschinsky the thyroxine acted on the hypophysis. Dr. Loeser pointed out however that hypophysectomised animals also developed a refractory thyroid under the continued influence of thyrotropic hormone; for this reason he concluded that there must be a second factor in which the pituitary played no part. Collip and Anderson had first shown that such a second factor existed; they had found that the blood of rats which had been injected for many weeks with thyrotropic hormone was able to inhibit the action of the thyrotropic hormone in another animal. The origin of this substance in the body was unknown but appeared not to be the pituitary, thyroid, adrenals, or ovaries. This antithyrotropic principle had been found in the blood of rats, guinea-pigs, rabbits, dogs, sheep, and horses after 4–9 weeks' treatment with thyrotropic hormone; it had also been found in normal blood of animals and man, but not in thyroidectomised animals nor in Graves's disease. Loeser and Trikojus had succeeded in concentrating the antithyrotropic principle and obtaining a stable powder, 25 mg. of which would suppress the action of at least 10 units of thyrotropic hormone. The extracts were active when given by mouth; their action was not type-specific, for the thyrotropic hormone from one species (cattle) could produce in a second species (sheep) factors which could suppress in a guinea-pig the activity of a thyrotropic hormone obtained from a third species (pig). The antithyrotropic principle was produced only if thyroid tissue or thyroxine was present; inorganic iodine was without effect in this connexion; the principle was effective only against the thyrotropic hormone.

The refractoriness of the thyroid in pituitary hyperthyroidism seemed to be an adaptation process to protect the thyroid against the thyrotropic hormone. It might work by limiting production of the hormone and its excretion from the pituitary or by barring the thyroid from the effect of the thyrotropic hormone. In either way the over-excretion of thyroid hormone did not occur; experimentally both were feasible for the excretion of hormone from the pituitary could be limited by giving thyroxine; encagement of the thyroid might be achieved by a substance, or substances, normally present in the blood the amount of which might be increased in hyperthyroidism. The principle seemed to act directly on the thyroid. The thyrotropic hormone therefore had not only the property of activating the thyroid gland but owing to the enhancement of the latter's function, of bringing counter-regulatory processes which protected the organism against further stimulation from the pituitary hormone, eventually reproducing the original state of the gland.

Dr. Loeser had found, however, that the organism's dual capacity to protect itself could be broken through by giving progressively increasing doses of the pituitary hormone; in this way he had been able to maintain and develop the signs and symptoms of hyperthyroidism until death supervened. He had shown this by giving equal total quantities of pituitary hormone to two series of animals, one receiving uniform doses, the other doses which were doubled every three days until death occurred; in the first group moderate changes which retrogressed were developed. In the latter group the thyroids of all the animals were much enlarged, being on average five times as large as normal; the adrenals were also enlarged and there was fatty degeneration and diffuse necrosis in the liver and kidneys; these effects were observed only when the hormone dosage was progressively increased and indicated a pronounced thyrotoxic damage since they were a feature of Graves's disease. Dr. Loeser thought therefore that a continuous state of hyperthyroidism could be produced in two ways. The first was continual animation of thyroid activity with the normal protective function still preserved—i.e., true pituitary hyperthyroidism. The second was failure of the protective mechanism with a constant or increasing animation of thyroid activity. The possibility of treating Graves's disease with highly active antithyrotropic factor was worth consideration in certain cases.

Dr. C. L. COPE said that the thyrotropic hormone was unfailing in its action. Since he first heard of it he had wondered what its relation was to the ætiology of Graves's disease. He had tried to find out whether the hormone circulating in the blood was increased in that condition. The serum of patients with Graves's disease appeared to contain an antithyrotropic effect. In order to discover whether the thyrotropic hormone appeared in the urine in Graves's disease, he had developed a chemical means of concentrating it, but even when large quantities of urine were used he had found no evidence of increased excretion. In the literature there was extraordinarily little agreement as to whether the hormone was present in the blood in Graves's disease; the balance of opinion seemed to be that if it were present it was rather below normal, and that it was slightly increased in myxœdema. On the whole it seemed that the hormone was behaving more as a friend than a foe to man in Graves's disease; there was little evidence so far that in that illness the hormone was produced in excess or was an ætiological factor.

Dr. RUSSELL BRAIN had been interested in cases of exophthalmos with ophthalmoplegia. In some of them the exophthalmos progressed after partial thyroidectomy, although the basal metabolic rate was lowered; these observations supported the views put forward by Marine and Rose.

Dr. A. W. SPENCE had been unable to find any evidence of increased thyrotropic hormone in Graves's disease or in two cases of spontaneous myxœdema. In the literature the results were conflicting. Graves's disease had been divided into two groups, the larger due to primary hyperthyroidism, the smaller to hypersecretion of thyrotropic hormone. The serum of patients might serve as an indication for diagnosis and treatment; some workers claimed success from deep X ray therapy on the pituitary. Dr. Spence had found antithyrotropic substances to be present in normal serum but not in the serum of Graves's disease; he thought that that disease might be due to lack of inhibiting substance rather than to excess of thyrotropic hormone.

Mr. A. S. PARKES, F.R.S., said that the term "anti-hormone" had first come from Montreal. Its meaning was not clear and he preferred to speak of antithyrotropic serum. He asked Dr. Loeser whether he had made immunological tests with that serum, to which Dr. LOESER replied that he had not. Dr. Parkes had been unable to find any antithyrotropic factor in the blood of six normal sheep.

Dr. LOESER said he thought Graves's disease might be due to too much thyrotropic hormone or to too little antithyrotropic principle.

SOUTH-WEST LONDON MEDICAL SOCIETY

AT a meeting of this society held at the Bolingbroke Hospital on June 9th, with Dr. T. A. CLARKE, the president, in the chair, the Bolingbroke lecture was delivered by Dr. CHARLES E. LAKIN who took as his title

Physical Signs: Are They Worth While?

Dr. Lakin said that his experience as a teacher and an examiner had convinced him that physical signs were receding from the important position once held in the minds of students. Radiology was to blame, for with its increasing use physical signs were regarded as unreliable, and time spent in gaining proficiency in examination as wasted. To argue in terms of radiology *versus* physical signs was an error, since radiology only provided another set of signs, confirming those found on physical examination or supplementing them. The X ray apparatus could not be carried in the waistcoat pocket, and anyone who had studied under the old masters knew how much information and certainty could be attained through physical examination alone. Interpretation of radiograms was often difficult and sometimes misleading, and he quoted a case where a patient had been kept in bed for many weeks on the strength of an X ray shadow (thought to indicate fluid) at one lung base, when physical examination would have shown no evidence of a pleural effusion.

Physical signs revealed the physical conditions of the organ studied, for example the volume, density, expansibility, conductivity, and moisture of the lungs. To determine the nature of the process at work physical signs had to be correlated with morbid anatomy, another field of study now declining in importance. Dr. Lakin agreed with Dr. R. A. Young who had recently deplored the present tendency of the young physician to avoid post-mortem work. The year 1761, he said, was notable for the publication of two books, the first being the five-volume work of Morgagni, then in his eightieth year, on the seats and causes of disease. The letters of which the book consisted gave accounts of the history, clinical condition, and post-mortem findings of cases side by side. Dr. Lakin read the account of a case of meningocele to illustrate the pleasant way in which the carefully observed facts were recorded. The book was the first real attempt to correlate post-mortem findings with what had been observed in life, and marked not only the beginning of morbid anatomy, but the beginning of modern clinical medicine. Another book published in 1761 was a treatise in Latin on a new device for percussing the chest by Leopold Auenbrugger. The son of an innkeeper of Graz, Auenbrugger applied to the human chest the principles of tapping on casks to determine their content. The published results of his seven years of observations on patients, checked in the post-mortem room, attracted little attention, although Stoll of Vienna used the method. Corvisart, having read of it in Stoll's lectures, republished the book in 1808 with his own notes, and immediately percussion took its place as one of the most valuable clinical methods. Cullen (1784) was the first to write of percussion in England, but he never practised it. The reason for this neglect lay in the fact that the anatomical conception of disease had not crystallised. Physicians thought in terms of symptomatic nosology, similar symptoms of widely differing ætiology being grouped together. Corvisart extended the use of percussion to cardiac disease and aneurysm of the aorta; he first described the presystolic thrill of mitral stenosis. What the historians called the pathologico-anatomical school of Paris, of which Corvisart was a distinguished member, was in reality a clinical school where the importance of correlating physical signs with morbid anatomy was recognised. Amongst the students attracted to Corvisart was Laennec, inventor of the stethoscope. Dr. Lakin told the story of this discovery, based on the use of the transmission of sounds by solids in physical examination. Laennec's "Traité de l'Auscultation Médiate" (1818), filled with his own careful observations, was one of the greatest books in medicine. Another name to be remembered in this connexion was Joseph Skoda of Vienna. Trained in medicine, physics, and mathematics, he had applied the laws of sound to physical diagnosis, and had established physical signs on a logical basis with definite laws, to which faith could be pinned.

In the use of physical signs there were many difficulties, some, such as extreme scoliosis, being insuperable. It was possible to be much misled, but in only a small proportion of cases. In the vast majority physical signs could be relied on, and a method should not be discarded because it was difficult. The younger generation wanted results in a hurry without labour or sweat. It had to be remembered that radiologists had difficulty in interpreting radiograms, which often failed to elucidate difficulties. The logical basis of physical signs was that examination showed the physical condition of the organ examined. The next step was correlation with morbid anatomy. In a case with the signs of a cavity at the base of a lung, morbid anatomical experience showed that it would be unusual for a tuberculous cavity to appear at a base unless there was one higher up. Percussion gave information about lung density, solid lung giving a higher pitched note than spongy lung. A musical ear was necessary, especially as there was so little tone about percussion notes compared with those of musical instruments. A high-pitched note resulted from solid lung or lung compressed by fluid. With fluid there was a greater feeling of resistance on the finger. Conductivity was tested by auscultation; the presence of bronchial or tubular breathing indicated solid lung, absent breath sounds that something intervened. Breath sounds arose in the larynx, solid lung conducting the sound better than spongy lung, which gave vesicular sounds. Sometimes there was bronchial breathing over fluid, and in such anomalous cases the signs could be interpreted in the light of displacement of the apex-beat. Expiration was prolonged when elasticity was lost, as in emphysema. Cavernous breathing resulted from air passing over the opening of a cavity.

A great deal could be learned from the study of physical signs without X rays. Dr. Lakin could not help wondering whether those who decried physical signs had ever got into the way of eliciting them. Perhaps they lacked a musical ear; perhaps they suffered from some defect of the organ of hearing.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever hospitals medical service group of this society on May 28th, with Dr. E. H. R. HARRIES, the president, in the chair, a paper on the

Heart in Diphtheria

was read by Dr. H. MASON LEETE (Hull City Hospital). Diphtheria, he said, had been especially severe in Hull during the past six years, and the numerous toxic cases gave opportunity for a study of the toxic myocardium. He had attempted to classify in a roughly quantitative manner the varying degrees of cardiac dysfunction. A clinical distinction was drawn between general toxic death in the first week of disease and cardiotoxic death in the second and third weeks. Changes in the relative intensities of the heart sounds could be recognised fairly constantly during the progress of a severe case, together with extrasystoles and reduplications, and it was possible to place these phenomena in a scale which shows increasing or decreasing cardiac impairment. Proteinuria is an almost constant accompaniment in cardiotoxic cases.

Dr. M. MITMAN (Eastern Hospital, L.C.C.) said that Dr. Mason Leete's clinical stages of diphtheria were substantially similar to his own. In the first week there was evidence of local lesions and general toxæmia, but electrocardiographic changes were rare. In the second week there was clinical and corresponding electrocardiographic evidence of cardiovascular damage in the more severe cases. Of the electrocardiographic signs the most common were changes in the form and voltage of the Q R S complex, changes in the direction of the T wave in significant leads, and evidence of conductive lesions in the bundle and its branches. He believed that lengthening of the P–R interval was not common, and that when damage to the main bundle occurred it produced a complete heart-block. Complete heart-block sometimes occurred with a normal pulse-rate. An indication of serious cardiovascular damages could be obtained not only from the quantity of albumin in the urine but also from the diminution in the quantity of urine passed. He believed that the cardiovascular phenomena in the paralytic stage, as well as the paralyses themselves, were of central nervous origin. He had inquired of physiologists if the cardiac irregularities and the tachycardia of this stage could be due to damage to the central nervous system, and had been assured that they could.

Dr. H. S. BANKS (Park Hospital, L.C.C.) said that, of the various factors concerned in the production of the heart lesion in diphtheria, not the least important was the dosage and route of injection of the antitoxin. He noted that none of Dr. Leete's cases had received more than 60,000 units of antitoxin, some as little as 16,000 units divided between the intramuscular and the intravenous routes. The division of the dose in this way was in his opinion unnecessary and wasteful. The effective dose in toxic diphtheria was the intravenous dose, and he advocated larger intravenous doses as a means of preventing or modifying the heart lesion. He knew the financial and mechanical difficulties involved in such a system of dosage, but believed that it paid handsomely. He asked whether any member had followed up the late W. E. Dixon's work on the prevention of the heart lesion by preliminary administration of large doses of digitalis. He had not so far been able to determine what cases, if any, were suitable for this method.

Dr. E. JAMES (Romford) expressed the view that gravis strains were not always responsible for a high case-fatality. In a series of some 800 cases of diphtheria admitted to hospital from Dagenham, Hornchurch, and Romford during the past 2½ years, approximately 70 per cent. were classified as gravis and 20 per cent. as intermediate strains, yet the latter had been nearly twice as lethal as the gravis. What was the explanation?

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

AT a meeting of this society on May 25th, with Miss E. C. LEWIS, the president, in the chair, a paper on

Recent Advances in Obstetrics

was read by Miss KEREN PARKES. She said that in no branch of medicine did practice vary so much among reliable authorities as in obstetrics. New principles were very slow to be universally established, and what was taught as an advance in one school might be condemned whole-heartedly in another. But during the last few years some important changes of outlook had been very general. For instance, in the study of the toxæmias of pregnancy, a subject always abounding in theories, there was now an emphasis on the primarily metabolic nature of these disorders, any actual "toxins" being considered as only the result of the disordered metabolism. In the treatment of minor degrees of disproportion in primigravidæ, the fashion for surgical induction during the last month had given way to the almost universal practice of trial labour at term, with the lower-segment Cæsarean operation to follow if necessary. In general, the overwhelming importance of the conduct of labour itself was gaining recognition, now that the first enthusiasm for antenatal care had subsided. Even the most skilled and thorough antenatal treatment could not avoid all the dangers and difficulties to be dealt with during the course of labour. For purposes of discussion clinical obstetrics could be divided into the antenatal, intranatal, and postnatal periods.

ANTENATAL

Antenatal care could not be limited to the nine months of pregnancy, since the woman's adjustment to this would depend on the state of her health and nutrition for years past. The province of the antenatal doctor thus covered almost the whole field of medicine. For early diagnosis the Aschheim-Zondek and the Friedman tests had a high degree of accuracy and had other uses, notably in diagnosing the intrauterine death of a fœtus, the presence of a vesicular mole, and the onset of chorion-epithelioma. A state of pregnancy having been diagnosed, the next problem was to maintain it. In cases of repeated abortion extracts of corpus luteum were now given. Since this extract was unfortunately still very expensive, an alternative method was to give large doses of a substance stimulating luteal activity which was found in the urine of pregnant women, marketed as Antuitrin S or Progynon. Pregnancy being well established there were three main objects in antenatal work: (1) the avoidance of difficult labour due to malpresentation and disproportion, (2) the avoidance and treatment of toxæmias, (3) the education of women in mothercraft and the hygiene of pregnancy. In each of these fields there had been some advance.

(1) By means of X rays in *pelvimetry* it was now possible to compare the actual diameters of the pelvis and of the fœtal head. Unfortunately estimates based on these elaborate measurements were all static and failed to allow for the alterations in flexion and the moulding of the head which took place under the influence of uterine contractions, whose strength and efficacy were quite unpredictable. In cases of *breech presentation* external version was now undertaken slightly earlier than used to be the custom—from 32 to 34 weeks, instead of from 34 to 36. Where version failed and the legs were extended, it was no longer customary to bring down a leg when pelvic measurements were normal unless there was delay in the second stage. In cases of acute hydramnios where X rays revealed a normal fœtus the tension of the liquor caused severe abdominal pain. It had been found possible to tap the amniotic sac through the abdominal and uterine walls, if necessary on several occasions, without disturbing the pregnancy.

(2) The *toxæmias of pregnancy* were now regarded as arising primarily from disturbed metabolism. The best protection against toxæmia was a good mixed diet, containing fresh foods, with plenty of iron, calcium, and vitamins, but it was still necessary to be constantly watching for early signs of toxæmia. Routine urine tests and blood-pressure readings were now the rule, but in the estimation of œdema an interesting advance had been the recognition that much help could be obtained from regularly weighing patients, "occult œdema" being revealed by excessive gain in weight. It appeared from Dame Louise McIlroy's work that the normal gain was greatest from the 24th to the 28th week, being on an average 3 lb., while in toxic cases the maximum gain occurred rather later, from the 28th to the 32nd week, and was about 4½ lb. Miss Grace Jones had drawn attention to the state of the retinal arteries as an index of the condition of the arterioles elsewhere in the body, particularly in determining when the changes were such that permanent renal damage was likely to result. Any sign of retinal exudate or hæmorrhage was an indication for the immediate induction of labour.

(3) Great changes were going on in the *maternity and child welfare services*. The supply of domestic help was an aspect of domiciliary midwifery which did not, Miss Parkes thought, always receive the attention it deserved. A supply of reliable home helps under the supervision of the local authority, who would guarantee them an adequate wage, would go far to encourage women to be delivered at home.

INTRANATAL

As to the intranatal period, the general trend was to minimise interference of every kind, and to realise that the passage of the head through the pelvis was a dynamic problem—i.e., the uterine forces were quite as important as the relative sizes of passage and passenger. A few years ago the induction of premature labour was very popular for cases where disproportion was feared at term, but now induction had no place in the treatment of primigravidæ with suspected disproportion. Doubtful cases of disproportion should all be submitted to a trial labour at term. If after some hours of good pains and rupture of the membranes the head was not satisfactorily in the pelvis, Cæsarean section must be performed. The lower-segment operation could safely be undertaken much later in labour than the classical operation. The routine use of anæsthetics in labour was becoming more general, and for the normal delivery self-administration of gas-and-air was considered best in combining safety and efficiency. Anæsthetics were important as a possible factor in the production of the condition known as "obstetric shock," a sudden and alarming collapse. The most effective treatment appeared to be intravenous saline, with stimulants such as Coramine or Icoral, and warmth. One complication of labour which had received more attention lately was the contraction ring, which occurred in otherwise perfectly normal cases, causing prolonged delay, and ultimately obstructed labour. It might arise at any stage of labour. When this was diagnosed early in the first stage the treatment was lower-segment Cæsarean section. Later, when infection had occurred and the child was dead, morphia, deep anæsthesia, and constant traction by weights attached to the perforated head were the only methods available to relax the ring. Should the contraction occur only in the second stage, delivery might be accomplished by forceps under deep anæsthesia, and with amyl nitrite. In the third stage, when fortunately the complication was rare, treatment was by manual removal of the placenta after dilatation of the ring—a very difficult procedure. In the intranatal period the baby also had to be considered. The resuscitation of the shocked or asphyxiated baby by lobeline had recently been recommended.

POSTNATAL

Finally, speaking of advances in the puerperal period, Miss Parkes referred to prophylaxis against sepsis, the importance of droplet infection, of septic foci in the patient herself, and of conditions such as tonsillitis or ear discharges in other members of the family, when the mother was being delivered in her own, often overcrowded home. Hæmolytic streptococci were now known to be the important organisms, but had been differentiated into twenty-two different types, varying in virulence, the eleventh being the worse. Prontosil Album (*p*-aminobenzene-sulphonamide) seemed to be an effective drug against hæmolytic streptococci, and its use provided an enormous advance in treatment. A complication which might arise during treatment with this drug was sulphæmoglobinæmia, which was manifested by cyanosis, especially of the lips, without any cardiac or respiratory distress. The condition appeared to be harmless as long as prontosil was stopped as soon as the cyanosis was noticed. Epsom salts should not be given to patients on prontosil, nor, in fact, any drastic purgative, for even those not containing sulphur increased the sulphides in the bowel by their irritating action. Another drug fostered by Queen Charlotte's was the widely used antiseptic Dettol.

An electrically driven breast-pump was a fairly recent innovation, and increasing interest was being shown in the reconditioning of weakened abdominal and pelvic muscles by massage and exercises. More practical advice was being given to women about the proper spacing of their pregnancies, and patients with heart or kidney disease were given careful instruction in birth control rather than a vague statement that they must not have any more babies. The available clinics giving advice on contraception were still woefully overworked and overcrowded, and there were large areas without any, but the need for them was being recognised, and their numbers were increasing. Miss Parkes illustrated her address with some Kodak films of a type of lower-segment Cæsarean operation, of difficult cases of breast-feeding, and of a case of pseudo-pregnancy, showing the disappearance of the phantom tumour under anæsthesia.

REVIEWS AND NOTICES OF BOOKS

Diseases of the Eye

A Text Book for Students and Practitioners. By EUGENE WOLFF, M.B., B.S. Lond., F.R.C.S. Eng., Ophthalmic Surgeon, Royal Northern Hospital; Assistant Surgeon, Royal Westminster Ophthalmic Hospital. London: Cassell and Co. 1937. Pp. 234. 15*s*.

IT is not easy to write a short text-book on any branch of medicine or surgery. One of the main disadvantages of compression is the elimination of discussion of controversial points, for the dogmatic statements which replace them do not always accord with clinical experience or current hypothesis. On the whole Mr. Wolff has shown judgment in his choice of subject matter, and has wisely abstained from confusing his argument by the inclusion of rare conditions and variations. To those who find diagnosis of the normal more difficult than that of disease the well-written chapter on the fundus is commended. The author has wisely refrained from condensing this important section. The section on squint, both paralytic and non-paralytic, is clearly written. Though only one page is allotted to the treatment of concomitant squint, this is set out adequately and without bias.

We hope that in the next edition of the book more attention will be given to the field where ophthalmology overlaps general medicine. These sections fall below the standard of the remainder of the book, notably in the chapter on diseases of the retina. The pages dealing with the retinal manifestations of vascular and renal disease lack precision and are out of touch with modern ideas. There is no reference to the important changes seen in the fundus in malignant hypertension. The section devoted to detachment of the retina could be enlarged with advantage to the general practitioner. The book is easy to read, though the use of italics to emphasise a phrase or word in the middle of a sentence is excessive and distracts attention from the argument. The work as a whole owes much of its value to the excellence of its illustrations. The anatomical drawings and those which show the position of the two eyes in relation to one another are far in advance of those usually found in text-books.

Surgical Pathology of the Thyroid Gland

By ARTHUR E. HERTZLER, M.D., Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas, and Professor of Surgery, University of Kansas. London: J. B. Lippincott Co. 1937. Pp. 298. 21*s*.

THE theme round which this book is written is mentioned in the preface: "If removing a part of a diseased gland is beneficial to the patient, what is more logical than to assume that removing the whole will be better?" The author suggests that all goitrous patients die a cardiac death, even when the goitre is of the so-called non-toxic varieties, and thus total thyroidectomy is the only logical treatment for a gland which is producing such a damaging secretion. He thrusts forward his views with an enthusiasm which is infectious, making the reader wonder why he has ever committed the "crime" of partial thyroidectomy. On second thoughts, however, the lack of evidence is found in many places to detract from the value of the arguments. No figures are given in support of Prof. Hertzler's belief either that patients with non-toxic goitre die a premature death, or that total thyroidectomy is so rarely followed by symptoms of hypothyroidism These views, which the author reiterates throughout the work, must not be allowed to supersede those held by the more orthodox. Prof. Hertzler adopts the classification of the American Society for the Study of Goiter, dealing fully with the naked-eye and microscopical changes in each type. Each chapter is profusely illustrated by excellent microphotographs and concludes with a brief review of the literature. It is disappointing that nothing is said about the ætiology of goitre in the chapter on general pathology. Very little space is devoted to chronic thyroiditis and carcinoma of the gland. The book is of very little value as a work of reference, but it makes pleasant and light reading and is excellently illustrated.

Buchanan's Manual of Anatomy including Embryology

Sixth edition. By J. E. FRAZER, D.Sc., F.R.C.S., Professor of Anatomy, University of London. London: Baillière, Tindall and Cox. 1937. Pp. 1772. 35*s*.

THE distinguished anatomist responsible for the new edition of Buchanan's Anatomy has assured to this notable text-book a great future. He has combined the advantages of studying the body by regions with the systematic consideration of osteology, neurology, and embryology, and both cytology and microscopic anatomy are presented adequately. To accomplish all this, nearly 1700 pages of text and 1042 illustrations have been required. A glossary of special anatomical terms and a serviceable index are additional attractions. Prof. Frazer has adopted the present English system of terminology which preserves some valuable traditional usages, is close enough to the International Latinised form to make it possible to pass easily from one to the other, and is handy and supple.

Many of those charged with the care of medical education are concerned about the immense volume of information nowadays presented to the student. It is felt that few, if any, can assimilate and reproduce it all, that the attempt to do so curtails individual reflection, and that in this technical flood education and training have been overwhelmed. Though there are just grounds for apprehension, things are not really so bad as this. Indeed, amidst the gloomy forebodings of our time it is some comfort to dwell on the great advance in the education, the eagerness of medical students to learn, and the success with which they meet the demands made upon them. This text-book of anatomy will be judged, then, by a standard which is concerned not with the volume of facts but rather with their wise selection, the manner of their presentation, and the interest and pleasure with which they are received. Judged by this standard, this book should continue to increase in popularity with students. It is not proposed here to consider its features in detail; some of them are regrettable—e.g., the omission, presumably deliberate, of radiology, and—a small point—the relation illustrated of the area striata to the posterior calcarine fissure is unusual; but the embryology demands special mention. This is Prof. Frazer's special field. His numerous published researches are regarded highly by other embryologists, and he has published a book on this

subject which contains the outcome of many years of fine work. In this text-book of anatomy he has assembled and illustrated the processes of growth and differentiation, and his mastery of the subject makes this section a notable contribution.

Surgical Anatomy

Third edition. By GRANT MASSIE, M.B., M.S. Lond., F.R.C.S. Eng., Assistant Surgeon, Guy's Hospital; Lecturer in Operative Surgery, Guy's Hospital Medical School. London: J. and A. Churchill. 1937. 18*s*.

WHY there should be a demand for books on surgical anatomy is one of the mysteries of medical education. The student who has spent at least eighteen months learning anatomy must have acquired the sort of familiarity with some book on anatomy which materially facilitates revision, while a practising surgeon nearly always finds, if he wants to refresh his knowledge of the anatomy of some operation, that for the detailed information he requires he has to consult an ordinary anatomical text-book. It is clear, however, that a large number of students feel the need for a treatise on surgical anatomy and their need is here met in a very efficient way. The information is given in an attractive form, so that the reader's interest is likely to be maintained. There are very few omissions but there does not seem to be a description of an approach to the back of the knee-joint nor of the anterior operation for excision of the stellate ganglion. The illustrations are good, many of them having been borrowed from reliable sources, and the diagrams clear.

American Pharmaceutical Association Year Book

1934. Vol. XXIII. Washington, D.C. American Pharmaceutical Association. Pp. 467.

THOUGH published in 1936 this book reviews publications during the year 1934. Brief extracts of papers from over 80 journals are given and are classified under the main headings of pharmacy, materia medica, and chemistry. There is much of interest to the physician since many of the abstracts deal with therapeutics, and excellent author and subject indexes are provided. The volume contains many details of proprietary remedies which when collected from the international literature form an imposing array. A list of hormone preparations is given (p. 87) and one can hardly help wondering if the ingenuity which is devoted to devising different names for the same substance might not be better employed.

How Animals Behave

By H. G. WELLS, JULIAN HUXLEY, and G. P. WELLS. London: Cassell and Co. 1937. Pp. 263. 4*s*.

THIS is a revised version of some sections of the "Science of Life," which the same authors published in one large volume some while ago. It is very cheap, in excellent format for convenient reading, and gives a most readable and interesting account of the behaviour of animals from protozoa to the apes; man's conduct is dealt with in another volume of the series. Apart from the exceptional clarity of the writing, the book is easy to follow because it is a coherent tale of the evolution of behaviour and not a collection of curious anecdotes. The argument is that lower animals can learn by trial and error, to which is later added heritable instinct which is more highly developed in, e.g., insects than in man; that constructive intelligence is found only in the apes and that generalised and abstract thought is the prerogative of man alone. It is unlikely that everyone will agree with this general outlook: insects and birds do things which are very nearly intelligent. And if it is easy to make a bird look a fool by interfering with a natural train of instinctive reactions, it is equally possible that the right kind of poltergeist might have little difficulty in demonstrating the silliness of man. But we recommend those who are interested to read the book and with it, to get a rather different point of view, E. S. Russell's "Animal Behaviour": they can then form their own opinions.

Experimental Physiology

By GEORGE H. BELL, M.B., B.Sc., Muirhead Lecturer in Physiology, University of Glasgow. Glasgow: John Smith and Son. 1937. Pp. 70. 4*s*. 6*d*.

NEARLY all books giving instructions for practical exercises in physiology provide a description of the class exercises carried out and the advice given to students in a particular laboratory. This one contains nothing strikingly original, but tips on how to make class experiments work satisfactorily are always valuable to teachers. The experiments described here are on the frog and human subject; illustrations of typical results accompany many of them, and the alternate pages are blank for students' notes. The style is intimate and direct, but, as is inevitable, the equipment of the Glasgow laboratory is taken for granted. The book should be of great value to students of this school, but among others its circulation is likely to be limited.

Sex in Religion

By G. SIMPSON MARR, M.A., M.B., Ch.B., B.D., D.Litt. London: George Allen and Unwin. Pp. 285. 7*s*. 6*d*.

Dr. Marr writes from the standpoint of a medical man who is also a churchman. That a balanced sex life is an important factor in health he shows in a series of historical chapters. These deal with primitive religions, the Old Testament, Egypt, Greece and Rome, the early and medieval church, the Reformation and modern times. His thesis is that though the Church has, up till now, adopted an ostrich-like attitude to the problems of sex, it need not continue to do so. Dr. Marr recommends that the churches of England and Scotland, working together, should set up a commission to investigate what part they could play in imparting to children a proper knowledge of sex problems, in guiding adolescents through the most critical period of their lives, and in recognising the diverse factors which make for happy marriage.

The book is agreeably written and well documented—there is an appendix containing a list of 300 books which have been consulted. It says little that is new; some of the author's deductions, moreover, are of questionable validity—as, for instance, that the increased use of contraceptives would go far to solve our unemployment problem. But though, to the medical reader, Dr. Marr may seem to be pushing an already widely open door, it must not be forgotten that clerical opinion on problems of sex is sometimes less realistic than medical, and tends to lag behind it.

THE LANCET

LONDON: SATURDAY, JUNE 19, 1937

SECOND BEST CARE OF THE EYES

THE Northern Counties Association for the Blind has issued a warning against the indiscriminate sale of spectacles. The Association is not, so far as we are aware, dominated by registered medical practitioners; its advice may therefore be listened to by the general public without any fear that it is an insidious attempt to bolster up a monopoly of professional practice. The Association expresses doubts of the wisdom of allowing a patient to select for himself a pair of spectacles from a tray on a street stall or in a multiple shop. The spectacles thus sold may be cheap, and the properly prescribed spectacles obtained from an optician may be dear; but any reasonable or even generous expenditure on the care of the eyes and the preservation of the sight is justified. Local authorities have power under Section 66 of the Public Health Act of 1925 (to be replaced next October by Section 176 of the new Act of 1936) to make any desirable arrangements for assisting in the prevention of blindness and for treating local residents who suffer from disease or injury of the eyes. The Northern Counties Association suggests that this statutory power might well be exercised so as to enable the poorer members of the community to have the best appliances. What has evidently impressed the Association is the twofold danger that inexpert selection from a tray may fail to correct defective vision and lead to the neglect of the disease underlying the defect. The insidious onset of chronic glaucoma, for instance, needs considerable skill to diagnose; failure to secure skilled examination of the patient's eyes may mean that a fair chance of preventing blindness is thrown away. Voluntary agencies are doing what they can. In addition to the clinics and the free services of specialists in the great hospitals the National Ophthalmic Treatment Board enables anyone with an annual income of less than £250 to obtain examination of the eyes and the prescription of glasses by recognised ophthalmic medical practitioners at a much reduced fee. If the fee is still out of reach of the poor patient, the local authority might make use of its power under Section 66. Blindness has become a special concern of the community. It is a false economy that leaves the layman to be his own expert. No one wants to overstate the danger; it is on record, however, that the departmental committee on the Optical Practitioners Bill of 1927 reported itself satisfied that the number of cases in which the patient might miss the opportunity of remedial treatment if the patient were not examined by an oculist was by no means negligible.

Just at this moment, as it happens, the National Health Insurance Joint Committee has issued some amendments of the Additional Benefit Regulations of 1930 in relation to ophthalmic treatment and optical appliances. There is to be a new committee, representing the approved societies and the opticians, to administer ophthalmic benefit. After next September an approved society may adopt a scale of charges drawn up by this committee for the provision of optical appliances of a defined standard, and in particular for allowing as a separate item "any charge for services rendered by an optician whether an optical appliance is supplied or not." Article 25 of the 1930 regulations defined the provision of optical appliances as including "any service rendered by an optician incidental to the provision of the appliance." The recent amendment seems to contemplate that the optician shall perform the "ophthalmic examination" which in the 1930 regulations meant "an examination of the eyes by a medical practitioner having special experience of ophthalmic work." If by its new regulations the Ministry of Health is giving official recognition to a form of unqualified medical practice, it is a curiously unobtrusive method of reversing the conclusions of one Royal Commission and two departmental committees. The latest annual report of the National Ophthalmic Treatment Board dealt faithfully with those apologists for the sight-testing optician who claim that, when glaucoma is present, he "may be considered absolutely capable in detecting the condition and thus safe from the public point of view." However admirable the education of opticians, their work has been the correction of errors of refraction. Their curriculum is not designed to equip them with the knowledge of physiology and pathology needed to detect the beginnings of disease.

The Minister of Health, in notifying the issue of the amending regulations, announces that they were framed after consultation with members of the medical profession. It would be interesting to learn what those representatives told the Ministry and how far the Ministry paid attention. Are those whose sight is defective going to get the best service? In a recent letter to the *Times* Dr. G. C. ANDERSON justifiably criticised the Ministry for encouraging the patient to seek what is admittedly the second best. Sir KINGSLEY WOOD is himself satisfied that the ultimate ideal is for all persons to go to medical eye specialists, and his plea that the number of these is insufficient has been denied by Sir JOHN PARSONS. The new regulations seem to deserve longer consideration than they have received. Issued by a procedure based on the sometimes overworked allegation of departmental urgency, they are technically Provisional Regulations. This should mean that, so far as England and Wales are concerned, though the regulations take effect forthwith, there will be an opportunity for any public body to object to them before they finally are published as Statutory Rules. The opportunity should not be neglected.

FRACTURE CLINICS

In a number of hospitals throughout the country a special department has now been set up for the treatment of fractures and the practice is extending. The public health authorities are beginning to recognise the importance of these clinics and to be interested in their organisation as a matter of public benefit and public economy. For this reason, as we noted last week, the committee appointed last year by the Ministry of Health to inquire into the rehabilitation of persons injured by accidents has thought well to issue an interim report.[1] The committee is anxious to ensure that the organisation of fracture clinics shall proceed along the right lines, so that individual clinics shall be efficient and established with due regard to local needs, while overlap is avoided. The report therefore deals with (1) the type of treatment and plan of clinic that should give the best results, and (2) the distribution of fracture services so as to put them in reach of all patients in towns and rural districts. The committee bases its scheme on the assumption that the clinics will be established at and as an integral part of existing hospitals. The principle is that all fracture cases shall be concentrated in one department and under a single control to ensure continuity of treatment and supervision of all stages of recovery right up to the re-establishment of full working capacity.

The type of fracture clinic planned by the committee has at its head a surgeon who is paid for his services. The prime responsibility is his and he is expected to devote a considerable proportion of his time to the work. The remuneration suggested is £500 for a surgeon-in-charge at a hospital of 500 to 1000 beds dealing with 2000 to 2500 fractures in the year, £300 where the hospital has 200 to 500 beds, with a proportionately smaller number of fracture cases. In the small hospitals, of 50 to 200 beds, the salary is proportionately reduced. For all the larger hospitals the scheme provides for one or two full-time assistants, who are senior members of the resident staff, for the services of a resident radiographer, and for clerical assistance. The efficient keeping of records is an essential part of the work. The services of two resident house surgeons, already on the staff of the hospital, are called on as required. For the small hospitals, the appointment of full-time assistants may not be justified, but arrangements would be made to secure the part-time service of the existing staff. It will be seen that this scheme departs in one main particular from the ordinary policy of voluntary hospitals in that it involves the payment for services of a member of the visiting staff. The committee points out that the time and service that will be required from the surgeon and the fact that knowledge of fracture treatment is of small financial advantage in private practice means that, without payment, hospitals cannot expect to secure the man best qualified for the work. One paragraph of the report suggests the possibility of fracture clinics becoming part of a general accident service which would no doubt include the supervision of all extensive injuries of the soft parts and ensure the skilled treatment of tendon injuries. Under the purview of such a service would naturally come the equipment and training of the ambulance corps. In the future the accident work of hospitals is likely to be divided off more sharply from the treatment of sickness, from which it differs profoundly. It is not good for a patient with a fractured leg or arm to be treated side by side with ill patients, whether in wards or in out-patient clinics. He is not ill, and what he needs is healthy competition in recovery with other patients like himself. Malingering is rare in a fracture clinic.

The report cites four criteria of correct reduction of fractures: (1) the limb must be the right length; (2) the bone must be in correct line; (3) there must be no rotation or twisting; (4) joint surfaces must be correctly restored. Fixation by plaster-of-Paris applied next to the skin is the general method advised. Traction is mentioned as the method of choice for fractured femurs. The importance of early use is emphasised as the basis of the modern treatment of fractures. In the planning of the routine work of the clinic arrangements are made for immediate treatment of casualties, for a session at which every case can be seen daily for the first few days, and for a weekly session at which attendance is arranged of all out-patient cases of fracture under treatment, all former in-patient cases of fracture, and cases reporting at varying intervals for follow-up purposes. This clinic is conducted by the surgeon-in-charge. It is strongly recommended that special wards be provided for fracture cases which require admission, and that they shall be placed under the care of the surgeon in charge of the clinic. Special arrangements may be made for fractures of the pelvis and for head injuries, and also for cases in which the fracture is a complication of an abdominal injury. That the equipment of the department need not be very expensive was shown by the report we recently published[2] of the municipal accident service at Cardiff. The covering letter sent with the report to the county councils and county borough councils expresses the hope that if these bodies are intending to establish clinics for themselves they will refer to the detailed scheme given in the appendix. Evidently the Ministry of Health expects local authorities to shoulder the responsibility for the efficient treatment of accidents. Suggestions are made for the treatment of patients in outlying districts by coöperation between small cottage hospitals and larger centres. The establishment of accident services is in many cases held up by lack of money. Last October a conference on the treatment of accidents was held in Manchester by the General Federation of Trade Unions. Employers' organisations are also showing interest in the efficient treatment of their workers. Could these bodies

[1] Interim Report of the Inter-Departmental Committee on the Rehabilitation of Persons Injured by Accidents. H.M. Stationery Office. Pp. 20. 4*d*.

[2] *Lancet*, Jan. 9th, 1937, p. 107.

not induce the great insurance companies to contribute? It is they who stand to gain most by the quick and complete recovery of the injured person. The numbers concerned are large. At 825 hospitals (724 voluntary and 101 municipal) which replied to the committee's inquiries nearly 202,000 new fracture cases were treated in the year 1935.

SUPERANNUATION IN THE LOCAL GOVERNMENT SERVICE

THE fact that local authorities are not obliged to make provision for their retired employees, though most of them, including the more important ones, have made such provision, has long been a matter of discontent. The Local Government and Other Officers' Superannuation Act, 1922, has been adopted, according to Sir KINGSLEY WOOD, by nearly 950 local authorities, and some 25 have Local Act schemes; but 587 authorities have made no arrangements for superannuation. It is not only to protect the employees of the last group, but to encourage free migration throughout the country in a service where varied experience is of high value to senior administrative officers, that an extension of superannuation provision is urgently needed. Hitherto, again, even those local authorities which have made such provision have been free to decide which of the posts in their service are designated as "established," and only the employees occupying "established" posts are superannuable. A Bill now introduced[1] is designed to ensure this privilege for all whole-time officers; as regards part-time officers and servants there is no compulsion, their inclusion in the scheme being left to the discretion of the authority. The normal age of retirement will remain at 65, except for female nurses, midwives, and health visitors, who will retire at 60, or if they wish, at 55, provided they have then completed 30 years of service. This permissive clause brings the scheme to some extent into line with the Federated Superannuation Scheme for Nurses and Hospital Officers, adopted by most of the voluntary hospitals of the country, which makes 55 the age of retirement; but a more fundamental difference unfortunately remains which will complicate any attempt in the future to follow up the coördination of the superannuation practice of local authorities by linking it with that of the voluntary institutions. The difference is that whereas under the Federated Superannuation Scheme the employer pays annually double the contribution of the employee (10 per cent. and 5 per cent. respectively), the local authority pay only the same proportion of the remuneration as do their officers and servants. Hitherto this has been 5 per cent., but the Bill proposes that in view of the change in interest rates since 1922, when Parliament last dealt with the matter, the contribution in respect of *officers* shall in the future be 6 per cent. from either party. The Bill in its present form offers only one small concession to those officers who may wish to seek experience in institutions other than those under local authorities; 12 months is substituted for 6 as the period constituting a disqualifying break of service. Migration between the services of all local authorities throughout the country, however, which was formerly liable to be penalised by loss or grave diminution of superannuation prospects, will involve no handicap if this Bill becomes law. Reciprocal arrangements are now for the first time introduced between authorities such as the London County Council which have local Acts and not only between those which have adopted the Act of 1922, and this applies to transfer values as well as to the reckoning of previous service. A criticism made of the Bill at its second reading concerned the fact that the inclusion of servants in the superannuation scheme remains optional; and Captain ELLISTON expressed disappointment that no provision was made in the Bill for the optional addition of a number of years, not exceeding ten, to those which professional officers had actively served. His plea for special consideration of the position of medical officers, in view of the late entry into the service due to long undergraduate and post-graduate training, was a cogent one. The debate recorded on another page was clearly only the first skirmishing round on a complicated issue.[2] The relief that legislation has at last been introduced on the lines recommended by the departmental committee under Sir AMHERST SELBY-BIGGE as long ago as 1928 will not prevent a careful scrutiny of the provisions of a Bill which will affect an increasing number of medical officers, nurses, midwives, health visitors, and other employees as the service of local authorities expands.

[1] Bill 141. H.M. Stationery Office. 1*s*.

ANTIBODIES AGAINST HORMONES

A NEW and fertile field of research was thrown open when COLLIP and ANDERSON proved that animals can develop resistance to hormones administered to them over long periods.[3] It has been established that the thyrotropic and gonadotropic hormones of the pituitary evoke such a resistance, and it is reported that the growth and ketogenic factors of the pituitary also do so. Clinically this observation is important, first, because it may explain why patients become refractory to further treatment, and, secondly, because an antagonistic substance produced in animals might be used to relieve disorders caused by excess of hormone. That such a substance can exist is shown by the fact that the serum of resistant animals will inhibit the action of the hormone in other animals, whether this hormone is secreted by the animal or injected by the investigator.

The hormones known to call forth this resistance to themselves are protein-like bodies, and it has been suggested that, like many proteins, they act as antigens, provoking an immunity due to the formation of antibodies. Clearly there is an analogy at least between the well-known mechanism

[2] A memorandum (Cmd. 5452) explaining the Bill has been issued and can be obtained from H.M. Stationery Office, 3*d*.

[3] Collip, J. B., and Anderson, E. M., *Lancet*, 1934, **1**, 76, 784.

of acquiring immunity to proteins and the formation of protective substances against hormones, and it is credibly reported that the intensity of precipitin reactions and complement-fixation reactions run parallel to the protective properties of the sera in the animal. One difficulty has been to distinguish between reactions due to hormones and those due merely to specific proteins. It has, however, been shown that if antiserum to ox pituitary is precipitated with ox serum, the supernatant liquid contains protective factors against ox pituitary, and this rules out the possibility of the antigenicity being bound up with the specific proteins. On the other hand, there is no known mechanism of auto-immunisation by which an animal becomes immune to its own pituitary; the hormone, to produce an antiserum, must come from a different species. This implies generally, in the present state of pituitary hormone chemistry, that it must contain heterologous protein, but it would appear that a greater zoological difference between the species from which the extract is made and the species which receives the injections is necessary for the formation of antisera to hormones than for the formation of antisera to serum proteins. The activity of hormone antisera against hormones is, again, subject to species- and source-specificity; for antiserum to gonadotropic hormone from pregnant-mare serum is only partially effective against other forms of gonadotropic hormone, and antiserum to extract of human pregnancy urine is not effective against ordinary pituitary extracts, whilst antiserum to ox pituitary is only partially effective against extract of human pregnancy urine. The immunological phenomena are consistent with the existence of gonadotropic hormones that differ in each species of animal but have less intricate and distinctive patterns, and structures less differentiated from species to species, than the serum proteins. Alternatively, the same gonadotropic hormones may serve a group of related species. The hormonal activity may be conceived as due to a prosthetic group common to all species, but so far it has not proved possible to separate a simple active compound containing such a group, in the way that thyroxine has been separated from thyroglobulins. The determinant groups responsible for serological reactions must, however, be independent of the hormonal prosthetic group, for antisera to gonadotropic hormone may be prepared with extracts of pregnancy urine whose potency has been lost after storage, or even from a fraction from normal male urine having negligible hormone activity. Logical as the scheme may seem, it may not be the whole story, and various considerations remain to be taken into account, especially in the case of the thyrotropic hormone. Dr. A. LOESER, whose work carries great weight, dealt with some of these in the discussion reported on p. 1462. His most striking discovery is that antithyrotropic activity is present in normal sheep's serum, and it is claimed that this activity can be concentrated into a particular fraction. Confirmation of these results would lead to modification of the straightforward immunological concept according to which an animal does not form antibodies to its own protein-like hormone.

Another provocative contribution to these problems is made by Prof. JULIUS BAUER and his collaborators in Vienna,[4] who find that injection of thyroxine into rabbits produces a resistant state, as judged by the disappearance of the fall in serum-lipase and of the loss in weight which are regarded as typical thyroxine effects. When this resistant state is reached, the serum shows a positive complement-fixation reaction if thyroxine is used as antigen. Normal rabbit serum does not give this reaction. When the sera of human patients are examined, it is found that this complement-fixation reaction with thyroxine is given by a large proportion of those with hyperthyroidism whereas the sera of those with other diseases are usually negative. Operation on hyperthyroid patients followed by cure is accompanied by a disappearance of the thyroxine complement-fixation reaction. These observations are potentially of great clinical importance and of theoretical interest in that they suggest that resistance to thyroxine is bound up in some way with a mechanism that is on the borderline of recognised immunological reactions. A full immunological effect this cannot be, for the sera of thyroxine-resistant rabbits does not confer resistance on normal animals. This work has been extended to the demonstration that not only thyroxine but also di-iodotyrosine, adrenaline, sympatol, insulin, tyrosine, and phenol can act as antigens, the suggestion being that the phenol group is the centre of a group of more or less unspecific serological reactions. More definite conceptions of these reactions must await further study. The complement-fixation reaction itself is little understood, and both immunology and endocrinology stand to gain from closer examination of these resistance phenomena.

THE MODERN MENTAL HOSPITAL

IN opening the new Runwell Mental Hospital (briefly described on p. 1487) Sir Kingsley Wood, the Minister of Health said that the national outlook towards mental disease had in recent years completely changed, and in no branch of public health services had there been such striking improvements in methods of treatment. The provision in the Mental Treatment Act of 1930, whereby voluntary patients could be admitted to public mental hospitals, had already had remarkable results. Of the 25,000 patients admitted to such hospitals last year nearly 27 per cent. were received on a voluntary footing. He did not think there was proof that the incidence of mental disorders in this country was rising. Nevertheless the problem was a considerable one and there were some 150,000 persons in this country at present under care by virtue of the Acts providing for Mental Treatment, whilst there were of course many more who suffered from mental instability and nervous disorders. Probably something like a third of all sickness, apparently physical, was in fact nervous in origin. He was glad to say that increasing numbers were voluntarily seeking treatment in the early stages of the disease and while they were still able to coöperate with the doctors.

[4] Bauer, J., Kunewälder, E., and Schächter, F., *Wien. klin. Wschr.* 1936, **49**, 399; 1937, **50**, 83. Bauer, J., and Kunewälder, E., *Wien. klin. Wschr.* 1937, **50**, No. 12.

ANNOTATIONS

STATISTICAL TACT

THIS week we publish in the form of a slender book [1] of under 200 pages Dr. Bradford Hill's pithy articles on the application of statistical principles to medical investigations. Those who followed these articles in the pages of THE LANCET in the early months of this year will find in the book some useful practical additions—notably a set of simple definitions of commonly used statistical terms and standard errors; a note of the precise meaning of certain expressions sometimes loosely used; and the conventions which are usually followed in expressing certain rates—e.g., maternal mortality-rate, attack-or incidence-rate, fertility-rate. There is included also, by permission of Prof. R. A. Fisher, F.R.S., and Messrs. Oliver and Boyd, a table constructed by him which is particularly useful for testing the presence or absence of association between characteristics which, like so many characteristics in medical work, cannot be quantitatively expressed.

Dr. Bradford Hill in his preface repudiates with some warmth any suggestion that the statistician is a cold-blooded organism who enjoys either refuting other workers' conclusions, or explaining that though these may well be true valid evidence of their truth is sadly lacking. He does not fancy himself in the rôle either of the armchair critic or of the confirmed sceptic, and he resents being forced into the ungracious position of having to turn down as inconclusive another man's sincere and serious work. The proper solution is for the worker in medical problems, clinical as well as preventive, himself to learn something of statistical technique, both in experimental arrangement and in the interpretation of figures. Dr. Bradford Hill has shown that, contrary to the general idea, no special mathematical ability is needed to grasp and apply elementary statistical principles and he has certainly illustrated precept by example. These examples make it clear that it is not only the senior worker surveying case notes collected over a long period with a view to extracting their statistical message who will find here the help he needs. Whoever is writing an article, preparing a university thesis, planning a series of experiments, contemplating the issue of a questionnaire, or concerned with deductions from samples typical (he hopes) of a larger population will gain from its study; and most of all, perhaps, the doctor anxious to use the opportunities of general practice to solve some clinical or epidemiological problem.

The main lessons the book teaches is that it is before an investigation is started rather than after it is completed that the principles underlying the collecting and interpreting of numerical evidence should be grasped, and that far from being a trivial and time-wasting ingenuity, the application of the numerical method to the subject matter of medicine is an important stage in its development.

THE DRUG TRAFFIC IN EGYPT

THE report of the Narcotics Intelligence Bureau [2] to the Egyptian Government for 1936, if less dramatic than the seven previous annual reports, yet affords invaluable evidence of successful vigilance in dealing with illicit traffic in noxious drugs. T. W. Russell Pasha, the active director of the Bureau, claims that Egypt has for years had more drastic legislation against illicit traffic than such as is provided for by the last convention on the subject drawn up at Geneva. While the general situation in Egypt is now said to be "fair to medium" it is claimed that a vast improvement has been effected since 1930 and the number of convicted traffickers and convicted addicts continues to fall. Indeed "under the post-treaty régime, the possibility of an almost drugless Egypt" is foreseen by the indefatigable Pasha. Internationally however the picture is not so reassuring. The situation at Suez is "disturbing." It is reported that "the majority of the Manchukuo heroin destined for America is now being routed from the Far East ports through the Suez Canal." Commerce in opium and heroin in Manchukuo appears to be entirely uncontrolled. "The world source of illicit white drugs to-day is China north of the wall and for some distance south of it. These areas are either under direct or indirect Japanese control." The chief market for this Chinese heroin is said to be America, no longer via the Pacific to Western ports, but through the Suez Canal to European ports for trans-shipment to New York. According to Russell "Ships' personnel and passengers can buy a kilo of heroin in Tientsin for 5000 francs; at Suez and Port Said they can find ready purchasers at 12,000 francs for the kilo who will dispose of their goods eventually with a very big profit to themselves." The report concludes by urging the closest possible coöperation with Great Britain and the United States so that the good work done by the League of Nations "shall not be undone and the world re-poisoned solely and entirely for the monetary profit of a mob of international rascals living under the protection of the political chaos of the Far East."

SECOND INTERNATIONAL CONGRESS FOR MICROBIOLOGY

So many and so diverse were the subjects under discussion at the meeting of the International Congress for Microbiology held in London during July of last year [1] that even the final issue of the papers could only be given in the form of abstracts. The report of the congress has now reached us in book form [2] under the editorship of Dr. R. St. John-Brooks, the honorary general secretary of the congress. Microbiologists throughout the world will find the volume full of interest and instruction as much of the work was chosen for presentation on the grounds that a clear international understanding of it was desirable. The discussions range through all the branches of parasitological and economic microbiology but no doubt, as with all really "live" meetings, the most important part of the transactions were in the personal conversation and demonstrations which took place during the congress. Among the questions of medical interest discussed were filtrable viruses, malaria, the diagnosis of enteric fevers, the prophylaxis of diphtheria and whooping-cough, and the serum treatment of diphtheria, staphylococcal, pneumococcal, and meningococcal infections, enteric fever, and so forth. The communications on these practical

[1] Principles of Medical Statistics. By A. Bradford Hill, D.Sc., Ph.D., Reader in Epidemiology and Vital Statistics in the University of London (London School of Hygiene and Tropical Medicine); Fellow and Member of Council of the Royal Statistical Society. London: The Lancet Ltd. 1937. Pp. 172. 6s.

[2] Egyptian Government, Central Narcotics Intelligence Bureau. Annual report for the year 1936. Govt. Press, Bulâq, Cairo, 1937.

[1] *Lancet*, 1936, **2**, 274 and 331.

[2] Second International Congress for Microbiology, London, 1936. Report of Proceedings. Edited for the executive committee by R. St. John-Brooks (honorary general secretary). London, 1937, pp. 579.

subjects give a good idea of present methods and tendencies in immunological forms of treatment. Prontosil and its congeners in the treatment of streptococcal infection came under review. Other sections covered microbiology in relationship to dairying and water-supplies, ensilage production, the destruction and preservation of timber; problems of the fermentation and canning industries also received attention. From such a wide selection it is almost invidious to select any special subject as of outstanding interest; but in the account of advances in virus study one reads with something of a shock the announcement of Prof. A. R. Dochez that he and his colleagues have kept the viruses of influenza and common cold alive and infections for as long as a year in chick-embryo medium. The novelty has not yet worn off the experience of watching filtrable viruses emerge from being mysterious and impalpable "qualities" to reach their present status as cultivable micro-organisms, with a defined morphology and a complicated and polymorphic life-history. All classes of microbiologists will be interested too in the discussions on the methods of maintaining the viability and virulence of bacteria, on selective bacteriostasis, the preservation of immune sera, the chemistry of antigens, and the chemical activities of micro-organisms. Among matters of more popular interest were the investigations recorded by Mr. B. E. Proctor of Cambridge, Mass., on the microbiology of the upper air. With the aid of an apparatus which he calls the bio-aerocollector, successive samples of air can be collected by aeroplane and submitted to microbiological examination. Viable bacteria, moulds, and yeasts were found to be present at altitudes of 20,000 feet or more during all seasons of the year and even pollen grains could be collected at very high altitudes. The volume will appeal to readers who wish to gain some idea of current activities in the world of microbiological research.

DR. JEKYLL DIAGNOSES MR. HYDE

THIS was Sir Walter Langdon-Brown's witty title for his Cavendish lecture to the West London Medico-Chirurgical Society on June 3rd. He began by saying that to the inheritors of nineteenth century materialistic medicine it was not a welcome discovery that the psyche was a causal factor in disease. The Freudian attitude to the unconscious was perhaps apt to give it too dark and depressing an impression. He himself started, therefore, from a biological standpoint as Rivers would have done. Structurally numerous vestiges of earlier evolutionary phases were to be recognised in the human body, and the human psyche from this point of view was likewise a product of evolution which showed many archaic features. Rivers did not accept Freud's conception of a censorship; he regarded the fantastic and symbolic forms in which hysteria and dreams manifested themselves as a regression to a lower level which was natural to the infantile stages of human development, individual or collective. We reached the higher levels of our nervous system on the stepping-stones not only of our dead selves but of our long dead ancestors. The lecturer could not doubt that medicine would have to become increasingly psychological in its approach. The new psychology was a compromise, a selection from the doctrines of different schools, but it was the needs of the present time that had led to its development. If some academic psychologists scoffed at it, the simple reply could be made that it worked. Although it was only in its infancy its influence was overflowing beyond the confines of medicine into many other fields of thought, just as did Darwin's exposition of the principle of evolution. A compact body of well-informed medical opinion on the subject could be a much-needed educative influence in a world which seemed to be steadily growing more psychologically sick. At the present time, added Sir Walter Langdon-Brown, the darker side of the collective unconscious was assuming a volcanic energy. If it was not to prevail we must live up to the Greek maxim, "Know thyself," or Caliban would reconquer the island he inherited from Sycorax his mother. "Dr. Jekyll must diagnose Mr. Hyde by recognising his origin. Am I too optimistic in hoping that the profession to which Jekyll belonged can by psychological insight play an important part in leading the way to a calmer, humaner, and more rational world?"

SOYA BEAN OR SKIM-MILK FOR INDIA?

THE difficulty of securing proper nutrition for the people of Europe seems great enough, but it shrinks into insignificance compared with the difficulty of securing proper nutrition for the people of India. The nutritional laboratory of the Indian Research Fund Association at Coonoor was already busy with practical problems when it was directed by Sir Robert McCarrison, and its fine traditions are being carried on by Dr. W. R. Aykroyd (who passed straight to it from the Health Section of the League of Nations) and his Indian colleagues. One of the many questions tackled is what foodstuffs, of those available, can best be used to supplement inadequate Indian diets, and a fruitful inquiry of this sort has just been reported.[1] Two methods of investigation were followed. One method was to weigh and measure groups of suitable children of whom some received the supplements to be tested while others acted as controls, and the second method was to reproduce as exactly as possible the supplemented and unsupplemented diets and to compare the growth-rate of rats receiving these. Excellent coöperation was obtained from missionary hostels for children where the diet was similar to, but rather better than, that consumed by the children at home. The supplements chosen were 1 oz. of dried (equal to 8 oz. liquid) skim-milk daily, or 1½ oz. of soya bean daily. The result was very striking and was confirmed by the animal experiments. There was an impressive increase in weight and height among the children receiving skim-milk, compared with the negative controls, but no benefit to those receiving soya bean. An improvement in general condition, a lessened liability to illness, and an increased vitality were also conspicuous. The outcome of the test is surprising, because cultivation of the soya bean has been advocated as being perhaps the key to the nutritional problem of India. Certainly the supply of protein of good biological value in such diets as those under consideration, described as "poor Madrassi" or "poor Hindu," is low, and one would have expected that the comparatively good protein of the soya bean would have gone some way to remedy it. It is of course possible that it did do so, but that the coexistence of some second grave deficiency in the diet was a limiting factor which prevented the benefit from appearing. If the skim-milk provided both the good protein and the other limiting factor a double benefit would appear. Aykroyd and Krishnan suggest that this second factor supplied by the skim-

[1] Aykroyd, W. R., and Krishnan, B. G., *Indian J. med. Res.* 1937, **24**, 1093.

milk and not by the soya bean is some constituent of the vitamin B_2 complex. A great problem of national housekeeping in many European countries is the disposal of a vast surplus of skim-milk. India could use this if it were dried, and Aykroyd and Krishnan discuss the practical politics of this suggestion. To-day, they find, dried skim-milk imported into India is too expensive to be used by the people but not enormously too expensive. It is subject to a 30 per cent. import duty, and if this impost could be abolished the cost would no longer be prohibitive and a big step would have been taken towards rescuing the children of South India from "a poor 'state of nutrition,' with their physical potentialities largely undeveloped."

BENZEDRINE

THE many and curious effects of benzedrine, which remained unnoticed for twenty years after Barger and Dale described it in 1910, continue to attract the attention of investigators, both of the dilettante variety, who take a dose or two of the drug out of curiosity or under the stress of approaching examinations, and of the more serious kind, who write papers about it. An annotation in these columns [1] last year drew attention to its main effects—namely, a rise in blood pressure, a relaxation of gastro-intestinal spasm, and a striking mental change involving euphoria, loss of fatigue, heightened intellectual activity, and talkativeness. Since then Davidoff and Reifenstein [2] have reported the effects of a 10–14 days' course of benzedrine on normal subjects, and on several groups of psychotic patients. The manifestations observed, both subjectively and objectively, are extraordinarily numerous and varied; it is abundantly clear that benzedrine acts very differently on different people. In the ten normal subjects, elevation of mood, over-talkativeness, and an increase in motor activity and general efficiency were the most frequent changes; if fatigue had been present it disappeared. But five of the ten developed a state of irritable restlessness which they did not relish, and from the case reports we learn that the increase of activity and efficiency sometimes involved a dangerous degree of disrespectfulness to superior officers on telephones. Fatigue sometimes appeared in subjects who had not felt it before taking the drug. A host of minor bodily sensations, pleasant and otherwise, are mentioned. In a number of the subjects, all effects diminished after the first few days, and little abnormality was observed in the second half of the period of administration. The action of the drug in the psychotic patients, many of them in depressed states, was roughly similar in kind but less in degree, and there was the same great variability. A detailed analysis led to the tentative conclusion that more stimulation occurred in patients depressed from toxic or organic causes (such as alcoholism) than in those with purely psychogenic disorders, and to the suggestion that the drug may be of value in making the minds of depressed or self-absorbed patients more accessible to investigation or psychotherapy. No use for it, comparable to that in narcolepsy, has emerged. On the other hand, Solomon, Mitchell, and Prinzmetal [3] have produced a fair case for its beneficial effect in post-encephalitic parkinsonism. They treated 28 patients, some with benzedrine alone, and some with benzedrine and hyoscine or stramonium. Nearly all of them experienced a decrease in drowsiness, when this had been present, and an increase in energy and well-being, which was therapeutically well worth while. No clear effect on rigidity or tremor could be demonstrated, but—most strikingly—six patients who suffered from oculogyric crises lost this distressing symptom completely, and two others almost completely, under the influence of benzedrine. Since inhibition of sleep is the conspicuous central effect of benzedrine, this observation accords prettily with Sir Arthur Hall's thesis [4] that oculogyric crises are really episodes of partial and disintegrated sleep. Solomon and his colleagues found, by contrast, that the drug was of no use in arterio-sclerotic parkinsonism or in psychotic patients with conspicuous asthenia, and out of their large experience they join other authors in giving warnings against its indiscriminate use. Its action varies so much, and the effects of its repeated use are still so little known, that caution is clearly advisable, especially in its administration to normal or relatively normal people, as distinct from those with chronic and incurable disorders.

[1] *Lancet*, 1936, **2**, 1475.

[2] Davidoff, E., and Reifenstein, E. C., *J. Amer. med. Ass.* May 22nd, 1937, p. 1770.

[3] Solomon, P., Mitchell, R. S., and Prinzmetal, M., *Ibid*, p. 1765.

CORRELATION BETWEEN INTELLIGENCE AND SIZE OF FAMILY

AN investigation into the correlation between size of family and intelligence was recently undertaken [5] by Mr. R. B. Cattell, Ph.D., with a subsidy from the Eugenics Society. Specially designed non-verbal intelligence tests were applied to two groups of children of ten years of age, who went to school in the urban area of Leicester and a rural area comprising the villages to the north and south of Dartmoor. The urban group comprised 2873 children and the rural 861. Briefly Dr. Cattell found that the stupider the children the larger were their sibships. In the urban area, the mean number of children per family was 3·36; in the rural, 3·63. The urban children of an intelligence quotient of 170 belonged to families wherein there were on average 2·35 children; those with a quotient of 70 to families whose average size was 4·13. Comparable figures for the rural children were 1·80 and 4·21. Children with quotients between these extremes belonged to families whose size was roughly in inverse proportion to their intelligence. Dr. Cattell draws from this data the conclusion that our national intelligence, being very largely hereditary, is declining at the rate of about three points in a generation or a point a decade. In a foreword he asks that his results and conclusions be submitted as early as possible for confirmation to a competent commission of social psychologists and economists and that, if confirmed, they should be taken into account by the Ministry of Health and the Board of Education.

The facts adduced by Dr. Cattell are unquestionably interesting and suggestive; but the informed reader will feel that they hardly support the crushing superstructure of social and philosophical theorising which is built on them. The technical basis of the inquiry receives but the scantiest discussion. No details are given of the specially designed non-verbal intelligence tests which were employed; the reader is not told whether group tests were used; and the all-important question of sampling is dismissed in a footnote. The confident quality of the generalisations and the boldness of the

[4] Hall, A. J., *Brit. med. J.* 1931, **2**, 833.

[5] The Fight For Our National Intelligence. By Raymond B. Cattell, M.A., B.Sc., Ph.D., Psychologist to the Leicester Education Authority. London: P. S. King and Son. 1937. Pp. 166. 8*s*. 6*d*.

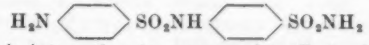
recommendations might even have been excessive if they had been based on hundreds of thousands of cases drawn from every county in England. Dr. Cattell deduces from his figures that a real deterioration of our race is going on here and now, day by day, hour by hour. To increase the medical and social services of to-day, without at the same time demanding restriction of births by those who use them is, we are told, as damnable a piece of wickedness as has ever been condemned by moral law. The husband should, indeed, be imprisoned for bringing into the world children beyond his means and, in all probability, below average intelligence. In discussing remedies, military similes are used. The presence of deterioration, having now been clearly proved, can be attacked. In this generation, the fight has been launched: the fight is on, and will be won by men and women fit for the hand-to-hand fighting of committees, with stamina to carry the struggle into the dust and heat of social welfare work in sordid cities, and with courage to face what may at first be a withering fire from strongly entrenched ignorance and sloth. Dr. Cattell's book suffers from language such as this.

SULPHANILAMIDE

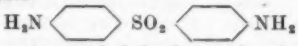
EVIDENCE that *p*-aminobenzenesulphonamide (= sulphanilamide) protects mice against meningococci [1] has led to its trial not only in meningococcal [2] but also in gonococcal infections. R. M. Fry and also Buttle and his colleagues have found that it is as effective against small numbers of gonococci as it is against meningococci in broth medium in vitro, and although therapeutic tests on animals cannot be carried out with the gonococcus the experimental evidence seems to justify its further trial in this infection. Dees and Colston [3] of the Johns Hopkins Hospital, Baltimore, report that since February of this year they have used sulphanilamide in 47 cases of gonococcal infection of the genito-urinary tract. In 36 of these the gonococci and the urethral discharge disappeared in less than five days, and in only 3 was there no demonstrable response. "The most striking feature of our experience," they write, "has been that in no instance has there been a progression of the infection, even in cases which showed no response to treatment." It is not stated how many of the patients returned for examination, but in only 3 of those who did so was there any recurrence, and these were all men who had discontinued treatment after a prompt response. Some patients tolerated a daily dose of 1 gramme per 20 lb. of body-weight for as long as a month without serious ill effects, but dizziness and lassitude were sometimes noticed at first, and sulphæmoglobinæmia was recognised in 1 of the first 19 cases (the remainder are not fully reported). It is not surprising therefore that Dees and Colston sound an "emphatic warning" about the possibility of unpleasant reactions, and though they are profoundly impressed by the prompt response, and especially by the way in which the spread of infection was checked—their object in presenting a report at this stage is to stimulate the careful use of sulphanilamide *in clinics* where large numbers of gonococcal infections can be closely studied. Such tests are already in progress in England, but we understand that the results so far obtained are less encouraging than those of Dees and Colston.

[1] Buttle et al., *Lancet*, 1936, **1**, 1286; Proom, H., *Ibid*, Jan. 2nd, 1937, p. 16.
[2] See *Lancet*, May 15th, 1937, p. 1183.
[3] Dees, J. E., and Colston, J. A. C., *J. Amer. med. Ass.* May 29th, 1937, p. 1855.

The latest paper by Rosenthal and his colleagues of the United States Public Health Service [4] describes further observations on sulphanilamide and related compounds in experimental pneumococcus, streptococcus, and meningococcus infections. These workers have prepared a new compound, disulphanilamide, which on subcutaneous administration (but not by mouth) proved slightly more effective than sulphanilamide against streptococcal infections in mice, though its "acute toxicity" was only one-fifth that of sulphanilamide. It was also more effective against meningococcal infections of mice. In this country Gray et al. [5] have also prepared disulphanilamide and report that (when given by mouth) it is slightly more effective than sulphanilamide against streptococcal infection of mice, while its toxicity is half that of the sulphanilamide by this route. The formula of disulphanilamide is



and it is interesting to compare its effect with that of diaminosulphone as described by Dr. Buttle and his colleagues [6]



In the streptococcal infections of mice diaminosulphone proved 25 times as toxic as sulphanilamide but 100 times as effective.

ARTIFICIAL HANDS THAT WORK

Baron Larrey relates in his memoirs that after the battle of Brezina he lay in bed, too exhausted to sleep, for on that day he had done more than 200 amputations; and as he lay there the thought came to him that it should be possible to use the muscles of the stump to provide motive power for an artificial limb. Some ninety years later Vanghetti, an Italian physiologist, made the first experiments on these lines; but the idea did not find practical application until the late war, first in Italy and then on a larger scale in Germany. V. Putti described some of these kineplastic operations at the Royal Society of Medicine in 1918,[7] and in 1923 came a brilliant monograph from Sauerbruch of Berlin.[8] First, a tunnel lined with skin is made through the triceps behind and another through the biceps in front. (If the amputation has been below the elbow-joint, then the tunnels are made in the extensor group of muscles behind and in the flexor group in front.) When healing is complete each tunnel is traversed by a removable ivory peg from each end of which a string passes to the artificial limb. The hand itself has four fingers acting as one unit, and the thumb acting as a second unit, and movement of the units is effected by contraction of the flexor or extensor muscles of the arm. At the end of his Macewen memorial lecture delivered in the University of Glasgow last week Prof. Sauerbruch showed a film illustrating the remarkable activities possible for patients who had lost both arms; several of the patients shown were in good employment as telephonists. The film opened with a view of two men fitting their own limbs without assistance. One of them then dressed himself, being able to carry out the finer movements necessary to button up trousers and coat. Another man, wearing his artificial hands, emptied a box of matches on a table and then with

[4] Rosenthal, S. M., Bauer, H., and Branham, S. E., *Publ. Hlth Rep., Wash.* May 21st, 1937, p. 662.
[5] Gray, W. H., Buttle, G. A. H., and Stephenson, D., *Biochem. J.* May, 1937, p. 724.
[6] Buttle et al., *Lancet*, June 5th, 1937, p. 1331.
[7] *Lancet*, 1918, **1**, 791.
[8] Sauerbruch, F. (1923) Die willkürlich bewegbare künstliche Hand. Berlin.

fine dissecting forceps picked up each individual match and replaced it in the correct position in the box. The film next showed an exhibition of writing by two patients, one of whom had also lost an eye. Another two patients made a combined demonstration in which one entered carrying a pail of water which he poured into the empty pail carried by his colleague. This manœuvre completed, they offered each other cigarettes and lit up in the usual way. Finally there was a close-up of two artificial hands in action, a shot which had æsthetic as well as technical value.

THE FERMENTATION OF PASTEUR AND CLAUDE BERNARD

IT is perhaps some consolation for ordinary men to behold great ones occupied by little quarrels. Generally speaking the great figures in the history of science have afforded fewer opportunities for us to reap this kind of consolation than have those who were great in literature and in the arts. Lawyers, too, and certainly politicians, provide more frequent and more violent exhibitions of invective called out by trivial causes than do the leaders of science. These considerations heighten the interest of the story which Dr. J. M. D. Olmsted relates[1] under the title "Claude Bernard's attack on Pasteur." The title is a little misleading, for the "attack" is to be found in notes which Bernard had never published and in all probability never intended to publish, at any rate in the form in which they were found. The two men were close friends in their lifetime, Bernard being some nine years older than Pasteur whose career he actively encouraged. Pasteur it was, however, who was instrumental in gaining much needed improvements in facilities for scientific work in Paris, and it was through his polemics that the Emperor was interested and that a suitable laboratory was provided for Bernard. The two scientists were, as is well known, both interested in the phenomena of fermentation, and engaged in experiments to find out its nature and causation and to demolish the theory of spontaneous generation. Their attitude to the question was, however, not the same. Bernard believed that the process of fermentation was purely a physico-chemical one, while Pasteur maintained that it was a form of life and did not occur without the presence of some living organism however minute. Bernard had actually helped Pasteur to demonstrate the truth of his contention by supplying the blood of a dog, which Pasteur sealed in clean glass vessels and kept in an oven at 30° C. for six weeks. At the end of this time Pasteur was able to demonstrate to the Academy of Science that even blood would not ferment out of contact with germ-laden air. Bernard nevertheless continued his own experiments, hoping always to be able to demonstrate the presence of some soluble ferment which caused the phenomenon of fermentation without the necessary presence of any living thing. Notes describing these experiments and the conclusions at which he was arriving, contrary of course to those of Pasteur, were the cause of the quarrel which arose after Bernard's death. D'Arsonval, Bernard's pupil and disciple, who had been given the task of going through his dead master's papers, took certain notes, with Paul Bert and Dastre, to Berthelot. They appeared soon after in the *Revue Scientifique* with a preface by Berthelot, who had previously attacked Pasteur on the subject of fermentation. The fat was in the fire. How Pasteur found in the notes "contradiction of the facts and conclusions which he had presented before the Academy," and "absolute condemnation without any restriction of my views on fermentation in general and on alcoholic fermentation in particular," how he did not believe at first that the notes were genuinely those of the dead Bernard, and how he triumphantly produced new and convincing evidence in support of his own view, should be read in Dr. Olmsted's lively account. In a sense both the great men were right. Fermentation is a physico-chemical process as Bernard maintained, and its cause is an enzyme which is provided by a living organism, as Pasteur asserted. Moreover, at present no one has succeeded in producing the enzyme synthetically without the aid of living cells.

[1] *Ann. med. Hist.* March, 1937, p. 114.

THE PAGET TRADITION

EVERY year the Research Defence Society commemorates its founder and first secretary by a lecture delivered at the annual meeting. On Tuesday last Prof. Grey Turner was the lecturer and in speaking on the debt of research to the Paget tradition he paid tribute to both father and son. Stephen Paget owed his belief in experiment and his zeal for science to his upbringing in the home of one of the leaders of medicine—an untiring worker who combined every day clinical practice with careful measurement, observation, and collection of facts; a surgeon steeped in the history of surgery who knew what experiment had done for his art. Sir James Paget's idea of the doctor's aim is reflected in his presidential address to the International Congress of Medicine of 1881: "We had better not compete where wealth is the highest evidence of success; we can compete with the world in the nobler ambition of being counted among the learned and good who strive to make the future better and happier than the past." And again in an address in 1863 to students at Bart.'s: "That which will most harass you in your practice will be the apparent success of dishonesty. You must be prepared for it, for it will not cease in your time, if indeed it ever does." To Stephen Paget, his father's biographer, James Paget was a continuing inspiration, and, as Prof. Grey Turner said, the most valuable of all the father's work for the promotion of research was the stimulus he gave to his son. As secretary of the Research Defence Society from its foundation in 1908 till his death in 1926, Stephen Paget was indefatigable in serving the cause of experimental medicine. Prof. Turner recalled his labours during the late war when attempts were being made to discourage antityphoid inoculation and Paget worked to the limits of his strength in delivering lectures to the troops in training. Poor health again interrupted his service as director of the Anglo-Russian Hospital in Petrograd, but up to the end of his life he used all his energy in the work he had chosen—work in which his object "was always to see fair play, to put the real facts squarely before his hearers and to inform them of what was often unknown and ill-understood." That is essentially the honesty of which his father spoke, and it is the enduring honesty of science.

INTER-DEPARTMENTAL COMMITTEE ON ABORTION.—This committee, which has been set up under the chairmanship of Mr. Norman Birkett, K.C., "to inquire into the prevalence of abortion and the law relating thereto, and to consider what steps can be taken by a more effective enforcement of the law or otherwise, to secure the reduction of maternal mortality and morbidity arising from this cause," has held a preliminary meeting and will shortly proceed to hear evidence. Communications may be addressed to the secretary, Committee on Abortion, Ministry of Health, Whitehall, S.W.1.

SPECIAL ARTICLES

THE LISTER INSTITUTE

A YEAR'S INVESTIGATIONS

(*Concluded from p. 1422*)

New growth factors in aqueous yeast extracts.—Dr. Macrae and Miss C. E. Edgar have shown that aqueous yeast extracts contain two factors, besides vitamin B_1 and lactoflavin, necessary for the growth of rats. One of these may be distinct from vitamin B_6, as described by György.

Chemistry of vitamin B_1.—Extending their earlier work in Edinburgh Dr. Todd and Dr. F. Bergel have completed a synthesis of aneurin (vitamin B_1). The synthetic product was identified with the natural vitamin by chemical and biological methods and the synthesis of a number of related compounds has been undertaken with a view to determination of the structural features essential for antineuritic activity.

Essentials for reproduction.—Miss Hume and Miss H. Henderson Smith have continued their study of the dietary deficiency in rats which affects their breeding capacity, the full-term young dying in utero or failing to survive after they are born. Preliminary work by Dr. Todd and Dr. Bergel having confirmed the value of rice-germ oil as a starting material for the isolation of the anti-sterility factor (vitamin E), the investigation of the unsaponifiable fraction of this oil as well as of the more commonly used wheat-germ oil has been taken up in collaboration with Dr. H. Waldmann and Dr. T. S. Work. From rice-germ oil several crystalline alcohols have been isolated and the various products are at present being tested biologically. It is not yet possible to state definitely whether or not any one of them represents the pure vitamin.

Vitamin-C requirements.—Mr. S. S. Zilva, D.Sc., has studied the relationship of the intake of ascorbic acid to the vitamin-C content of the "selective" organs and other tissues of guinea-pigs, to their susceptibility to scurvy, to the urinary excretion of ascorbic acid, and to their general well-being.

He found that in order to attain the maximum concentration in the tissues ten times the protective dose had to be given. Only traces of the vitamin were established in the "selective" tissues when a daily dose 2–3 times as great as the protective dose was administered. Guinea-pigs, the tissues of which contained these minimum amounts of vitamin C, were, however, observed to live for a number of years, during which time they attained very high weights. Furthermore, the time taken by guinea-pigs to succumb to scurvy when placed on a scorbutic diet was not appreciably different, whether the tissues carried their maximum load of ascorbic acid or whether only traces of it were present in them, prior to the animals being deprived of the vitamin. The accumulated vitamin C in the body of the guinea-pig, therefore, does not act as a store in the true sense of the word.

The results of this investigation are in accord with the general observation made by Zilva and S. W. Johnson some years ago on human beings and lend support to the view that there is a wide margin of "unsaturation" with vitamin C which has no obvious detrimental effect on the health of the individual.

Vitamin C and cataract.—The presence of vitamin C in the aqueous humour and lens in relatively high quantities has attracted the attention of those interested in the ætiology of cataract and contradictory views are held concerning the significance of this fact. Dr. Johnson has devoted his attention to the fate of the ascorbic acid in the humours and lens of the eye of the guinea-pig in the process of depletion of vitamin C, but his results suggest that the deprivation of guinea-pigs of vitamin C has no direct bearing on the ætiology of cataract in these animals.

Synthetic ascorbic acid in canning fruits and vegetables.—It has previously been shown that it is possible to add ascorbic acid to fruits and vegetables before canning without incurring serious destruction of the acid during the process. Preliminary work by Dr. Zilva and Mr. T. N. Morris has been carried out on the stability of the acquired antiscorbutic potency of these final products. Apples canned in January, 1935, were tested in September, 1936, by the biological method, and no perceptible loss in activity during storage was recorded.

CALCIFICATION

Calcifying mechanism of bone.—Previous work has shown that the activity of the calcifying mechanism of the hypertrophic cartilage of the bones of rachitic rats is generally lower than in that of normal embryonic bones. Is this decreased activity merely a sequel to the failure of the cartilage to become calcified or is it partly responsible for this failure? Prof. R. Robison, F.R.S., and Miss J. Barnett have observed a very striking increase in the activity of the calcifying mechanism in bones of rachitic rats which have received a single moderate dose of calciferol (5–30 international units vitamin D) within 24–48 hours of death. Calcification of these bones in vitro occurs at unusually low levels of calcium and phosphate concentrations, even lower than those required for normal bones.

It has been shown by other workers that the type of rickets induced by addition of beryllium salts to the diet does not respond to vitamin-D therapy. In agreement with this it has now been found that the administration of very large doses of calciferol (up to 100,000 I.U.) shortly before death produces no increase in the very low activity of the calcifying mechanism of the bones.

Calcification of the aorta.—Prof. Robison and Dr. M. Laskowski (Warsaw) have completed their experiments on changes in the aorta in hypervitaminosis D. Calcification of this vessel occurs very rapidly in rats receiving large doses of calciferol with a diet of high calcium content but may remain absent if the calcium intake is sufficiently reduced. Experiments made with the aortæ of these rats have failed to produce any evidence of changes in the organic tissue before deposition of calcium salts but facilitating such deposition, analogous to the effects observed in bone. The results must be taken as supporting the view that calcification of the aorta in hypervitaminosis D is primarily the result of supersaturation of the blood with calcium salts.

Lactation.—Dr. G. A. Grant has investigated the influence of certain hormones in reinstating lactose synthesis in vivo in regressing mammary glands of female guinea-pigs which have just ceased lactation. The lactogenic factor, prolactin, induced these regressed glands to produce only a limited secretion of a milk-like fluid of very low lactose content (0·2–0·4 per cent.). However, active secretion of milk containing 2·5 per cent. lactose is produced by prolactin, if the secretory cells of the acinar tissue have undergone a reconditioning process through treatment of the animals with œstradiol and progesterone. Certain substances, for example diphenyl-α-naphthylcarbinol, which do not possess the phenanthrene nucleus characteristic of the sex hormones,

also caused mammary growth in male animals, though the possibility of this being an indirect effect on the general endocrine system requires further examination.

SERA AND VACCINE

Specific antigen of Shiga's bacillus.—At Elstree Mr. W. T. J. Morgan, Ph.D., has continued his investigations into the nature of the specific antigen of *B. dysenteriæ* (Shiga). It has proved possible to recover the bacterial antigen in a form which can be considered to be its natural state. It is a polysaccharide-lipoid complex, which readily engenders in the rabbit specific agglutinins and precipitins for *B. dysenteriæ* (Shiga). The polysaccharide represents about 40 per cent. of the antigenic complex; an account of its chemical structure was given in last year's report.

Spore-bearing anaerobes.—Mr. D. W. Henderson, Ph.D., has continued his study of the protective substances in specific antibacterial sera which control experimental infection with *Clostridium œdematis maligni*. His observations suggest that antibacterial prophylaxis may find practical application in the control of infections associated with this organism.

Meningococcal infection.—Dr. G. F. Petrie has confirmed the statement that an inoculum containing a comparatively small number of living meningococci suspended in a solution of mucin is lethal to mice by intraperitoneal injection. It is now possible to estimate without difficulty the relative virulence of meningococcal strains by means of the mucin technique. Thus a Group I culture maintained under routine conditions for the past three years has proved to be as virulent as several freshly isolated strains. It is intended soon to investigate the therapeutic action of antimeningococcus sera in mice with the aid of mucin.

Type-specific antistreptococcus sera.—Dr. Petrie and Dr. Henderson have immunised rabbits and horses with three serological types of streptococcus which are often present as pathogenic agents in a variety of streptococcal infections in man. The rabbits have responded satisfactorily, as judged by their agglutinin titres, but the horses have yielded sera of much lower titre. Experiments are to be carried out in mice to ascertain whether the protective action of the experimental antistreptococcus sera is strictly type-specific. Preliminary tests indicate that the limits of error are wider than those of similar tests in use for titrating antipneumococcus serum, Type I.

Stabilising action of glycerin on toxins and sera.—The experience of the past fifteen years at the serum department has proved that the addition of 50–60 per cent. glycerin to tetanus toxin has a remarkable stabilising action on it and thus facilitates its use as a laboratory standard in routine tests of samples of antitoxin.

Within recent years the principle has been extended to the toxin of *Cl. welchii* and to dysentery toxin (Shiga). Technical difficulties have hitherto precluded the application of the method to diphtheria toxin but Dr. Petrie has now prepared a glycerinated toxin by a simple method which permits of some degree of purification and of a threefold concentration of the lethal toxin. The L+ dose of this preparation is 0·0133 c.cm. and the average lethal dose is 0·0002 c.cm. for guinea-pigs of 250 grammes. The addition of glycerin to antitoxic and antibacterial sera is known to have a stabilising influence on the specific antibody and the method has been applied to most of the laboratory serum standards in use in the department. Glycerinated preparations of this kind possess the great advantage that they can be stored at −10° C.

Dr. Petrie and Dr. Morgan have made further observations on the rate of destruction of the protective antibody in batches of natural and concentrated *antipneumococcus serum*, Type I, on storage. The concentrated product loses potency much faster than the natural serum, and the loss takes place mainly during the first year. Dr. Petrie has begun similar observations on the stability of the specific antitoxin in *anti-dysentery serum* (Shiga).

Elementary-body suspensions in Jennerian prophylaxis.—Behrens and Neilson in 1935 described a method for purification of vaccinia virus by isoelectric precipitation of the associated proteins in a suspension of vaccine pulp. Dr. D. McClean has studied this method and its application to the production of bacteria-free suspensions of elementary bodies suitable for intracutaneous injection in Jennerian prophylaxis. It appears that the storage of elementary-body suspensions of vaccinia prepared for clinical use is unlikely to present serious difficulties.

TISSUE PERMEABILITY AND LOCAL IMMUNITY

Dr. McClean has completed the observations begun by Dr. Favilli (Perugia) and himself on the relation between tissue permeability and local immunity to infection.

The inhibition of the diffusion of crude testis extract in the dermis by Besredka's "antivirus," plain broth, and various substances known to reduce the permeability of the cell, was reported by Favilli and his collaborators; this has been confirmed, using purified preparations of the diffusing factor from the testis. Culture filtrates from certain invasive bacteria cause a dramatic increase in the permeability of the tissues and it has been shown that the diffusion of the purified spreading factors obtained from these filtrates is similarly inhibited by the same agents. The mechanism of this inhibition has been investigated and it appears that it is the inflammatory cellular response provoked by the injection of "antivirus," plain broth, and other substances, which renders the tissues less permeable to these diffusing factors, whether they are derived from the testis or from bacteria. These observations supplement the work of Menkin on the local fixation of inflammatory processes, and they indicate that "local immunity" may be explained, at least in part, by a non-specific reduction in the state of permeability of the tissues. They also indicate the importance of the balance between the diffusing activity of invasive bacteria and the reduction in local permeability that results from the inflammatory response by the host.

Apart from the purely local reaction, it is known that the diffusing factors of bacterial origin are antigenic and provoke the appearance of neutralising substances in the serum. Preparations are being made for a serological investigation of the relation between purified diffusing factors derived from different bacterial species such as staphylococcus, *Cl. welchii*, and *Cl. chauvoei*.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

TOWARDS A NATIONAL PUBLIC HEALTH POLICY

AN important step in the direction of an agreed programme between organised medicine and the State for the care of the indigent sick was taken on May 24th when the house of delegates of the Medical Society of New York accepted a report of its committee on the provision of medical care. The report accepts as a principle that the health of the people is a direct concern of the Government, and a national public health policy directed toward all groups of the population should be formulated. This extension is to be governed by the approval of the local medical profession and is to incorporate to the greatest possible extent the services of the general practitioner

in preventive medicine. Among the practical proposals designed to carry out these principles are the following:

"That the first necessary step toward the realisation of the above principles is to minimise the risk of illness by increasing preventive efforts through extension of public health services, federal and local.

"That an immediate problem is provision of adequate medical care for the medically indigent, the cost to be met from public funds.

"That public funds should be made available for the support of medical education and for studies, investigations and procedures for raising the standards of medical practice. If this is not provided for, the provision of adequate medical care may prove impossible.

"That public funds should be available for medical research as essential for high standards of practice in both preventive and curative medicine.

"That public funds should be made available to hospitals that render service to the medically indigent and for laboratory diagnostic and consultative services. That these consultative and laboratory diagnostic services shall be established only in regions where the medical profession approves the need for same, and after consultation with the local medical profession in the area affected.

"That in the allocation of public funds existing private institutions should be utilised to the largest possible extent and receive support so long as their service is in consonance with the above proposals."

These proposals, along with a request for a working definition of the term "adequate medical care," were before the house of delegates of the American Medical Association when it met last week.

THE TRAILER

The automobile trailer, like the house-sparrow, is said to have been imported from England. In recent years these mobile homes have manifested a remarkable crescive faculty. Since Mr. Sherman, whose money came from his father's vaccine laboratory in Detroit, exhibited the first trailer at a Detroit automobile show in January, 1930, his business has grown by leaps and bounds. Last year he sold 6000 "covered waggons." Total factory production was about 35,000, and the *Automobile Daily News* estimates that 160,000 trailers were on the road.

A survey of the American Municipal Association, the Society of Planning Officials, the American Public Welfare Association, and the National Association of Housing Officials arrives at the estimate that this summer there will be 400,000 automobile trailers in use, housing 1,250,000 persons. It is not necessary to accept Roger Babson's forecast that within twenty years half of the population of this country will be living in trailers before we convince ourselves that trailer housing constitutes a genuine public health problem.

When *is* a trailer a house? When its wheels have been removed (as one of our recent ordinances decrees) or when it has stood for a specified number of days in one particular spot? Most trailers have no refrigeration—what happens to the food and milk carried on board? The common solution of this problem has led to the nickname of "tin-can tourists" being applied to trailer folk. Above all, how shall the trailer dispose of its garbage and sewage?

Florida welcomes trailers and provides comfortable sanitary trailer camps equipped with running water, sewerage connexions, electric current, shower-baths, and toilet facilities. Rates for a site in such camps vary from one to ten dollars a week. If the trailer contains children Florida charges a licence fee of 12 dollars towards the cost of their education. In some of the camps doctors, themselves living in trailers, are licensed to practise medicine among the rheumatic, bronchitic, sinus-infected refugees from northern cold and snow. On New Year's Day trailers crossed the State line into Florida at the rate of 25 an hour.

Northern and western States have not all proved themselves as adaptable to the refugees from summer heat. Municipal ordinances, it is whispered, have been devised ostensibly to protect the public health but actually in the interests of hotel proprietors and real estate firms. Unable to rely on finding a camp with sewerage provisions, the trailer builders have resorted to a number of ingenious devices. There is the chemical toilet, of course, whose treated effluent is probably harmless *if* it is properly treated. Or there may be a simple container with provision for "deodorising" until opportunity for decent burial occurs. A modern contrivance makes use of a waterproof paper bag which can be securely sealed after use and disposed of at leisure.

There is at least one travelling tuberculosis sanitorium that provides a perpetually ideal climate and the distraction of travel, as well as all modern medical care and (it is said) adequate rest for the patients.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A SEQUEL TO INOCULATIONS: THE JURY'S VERDICT

THE inquest at Ring, co. Waterford, on a girl of 12, who had died from generalised tuberculosis following an immunising injection against diphtheria (see *Lancet* May 29th, p. 1305), was continued on June 10th and concluded at the district hospital, Dungarvan, on June 12th. Dr. Walsh, the acting coroner, put the following questions to the jury: (1) when, where, and from what cause did the deceased die? (2) Was the ulcer on her arm a tuberculous ulcer? (3) If it was a tuberculous ulcer did the general tuberculous condition from which she died spread from this? (4) If it was a tuberculous ulcer, did the microbes causing it enter the body at the time the child was inoculated against diphtheria? (5) If they did enter it at the time what was their source and how did they come to be injected?—With regard to his last question the coroner said that the lines for an investigation with any hope of reaching a solution seemed to him to be almost endless. It must needs be a long, searching, and highly scientific one, more properly carried out, in his opinion, by a body of scientists than by a coroner's jury. "If you believe," he said to the jury, "that you are not in a position to give an opinion as to the origin of the tubercle bacilli, you will say so. And I cannot see how you are in such a position." The jury then brought in a verdict as follows:—

"That we unanimously agree with the medical testimony that Siobhain Kennelly died at Knockenpower on April 20th, 1937, from toxæmia and purpuric hæmorrhage consequent to general miliary tuberculosis infection, and that we are of opinion, according to the evidence placed before us, that the tuberculous condition was originated by the inoculation of prophylactic into the right arm of Siobhain Kennelly in November, 1936, and that we are of opinion that the contents of the 25 c.c. bottle of prophylactic labelled 'T.A.F. Burroughs Wellcome,' from which a portion of the material was extracted by Dr. Daniel McCarthy for the purpose of the aforesaid inoculation, contained tubercle bacilli, and that the inoculation was carried out by Dr. McCarthy according to the most approved surgical technique. Every precaution was taken by him and by those who assisted him to guard against infection arising from contaminated surgical applications, and we exonerate them from any blame in this matter."

Giving evidence about other children at Ring College who suffered after a similar injection, Dr. P. Kiely (Cork) said he had examined 10 of the original 11

children and found practically all the primary lesions healed, and in all the condition of the glands greatly improved. Replying to counsel he said that in his opinion the future development of the children would be entirely favourable.

TREATMENT OF TUBERCULOSIS

Speaking at the annual meeting of the Royal National Hospital for Consumption for Ireland on June 10th, Dr. T. G. Moorhead drew attention to the recent addition of a fully equipped operating theatre. The facilities for operative work were now as good as in any hospital in Great Britain or Ireland. He added that it had been stated that it was proposed to establish sanatoriums in every county in the Irish Free State. He thought that if that were so they should limit their activities to incurable cases. If they were to compete with such institutions as those at Newcastle and Peamount they would do more harm than good. He understood that there was also a project to establish a central surgical hospital for tuberculosis. That might be a good thing but it was a better thing to have treatment carried out in one institution.

MEDICINE AND THE LAW

Dismissal of Officials under Lunacy Act

THE tenure of officers appointed under the Lunacy Act has been examined afresh by the Court of Appeal in McManus *v.* Bowes. Section 276 of the Act requires the visiting committee of every mental hospital to appoint a medical officer, and adds that "the committee may remove any person appointed under this section." Does the word "remove" mean "remove at the committee's pleasure"? If a statutory authority has power to appoint and remove officers, is it entitled to dismiss at a moment's notice? This, said Lord Justice Slesser, is a matter of great importance because it goes to the root of the tenure of everyone employed under the Lunacy Act.

Dr. Hugh McManus, formerly assistant medical officer of the Park Prewett Mental Hospital, Sherborne St. John, Hampshire, claimed damages against the Hampshire Joint Mental Hospital Committee for wrongful dismissal and also sued for the return of his superannuation contributions. He had originally sued Dr. R. F. B. Bowes, the former medical superintendent of the hospital, on the ground that Dr. Bowes had unlawfully procured the committee to dismiss him. At the trial before Mr. Justice Macnaghten it was held that there was no evidence to go to the jury in support of the allegation against Dr. Bowes. On appeal the Court of Appeal likewise released Dr. Bowes from the proceedings for want of evidence against him. The case was then dealt with on the issue of the power to dismiss without notice. It was argued for Dr. McManus that there was nothing in the reported cases which should incline the court to interpret "remove" as "remove at the committee's pleasure." Lord Justice MacKinnon was puzzled by the fact that the committee had purported to give Dr. McManus three months' salary in lieu of notice. Under what power did the committee do so? Could the district auditor have surcharged this sum as an illegal overpayment? Lord Justice Slesser asked whether, if an official had a two-year contract, he could still be dismissed at pleasure? After full argument the Court of Appeal was unanimously of opinion that the committee had power under the Lunacy Act to remove one of its servants at will. The judge at trial had ruled that the plaintiff's claims were barred by the Public Authorities Protection Act, 1893, because they were not brought within the statutory time-limit of six months. The Court of Appeal declined to interfere.

Substantial Damages for Release of Mental Patient

As the medical profession is well aware, there can be heavy damages against a doctor whose certificate causes a mental patient to be confined or retained in an institution. The substantial award of £3500 has now been given in the converse case of a too early release. At Liverpool assizes last week Mrs. Bertha Holgate, with her husband, successfully sued the Lancashire Mental Hospitals Board and two doctors of the Calderstones Institution near Blackburn. The defendants, she contended, had committed a breach of statutory duty and had been negligent in licensing John Lawson, a mental defective, to be absent from the institution. Lawson had attacked her at her home and she had suffered serious injuries. Sir Patrick Hastings, K.C., who opened the plaintiff's case with characteristic vigour, stated that Lawson, aged 29, was a dangerous criminal who had been charged with housebreaking, larceny, assault, attempted rape, and robbery with violence. Lawson had been an inmate of Rampton Asylum. From this State institution he was transferred to Calderstones on the assumption that his condition was improved. Lawson's brother (described by counsel as a working man with very little leisure to look after anybody else) applied for his temporary release on licence and assured the committee that the patient would remain under his personal supervision. John Lawson went to Mrs. Holgate's house, said he was hungry, and asked for a cup of tea. When her back was turned, he picked up a piece of wood, came up behind her and struck her on the head. Her skull was fractured and her wrist and hand were also injured. One year of her life had been wiped out and no one could say how many more years she might not lose through her injuries. The two defendant doctors, Dr. F. A. Gill and Dr. G. S. Robertson, were respectively the superintendent and deputy superintendent at Calderstones. Dr. Robertson had signed the licence; Sir Patrick Hastings emphasised that only the superintendent had authority to sign.

Counsel for the defendants reminded the jury that Dr. Gill had spent a lifetime in the care and treatment of mental deficiency, and Dr. Robertson had 12 years' experience of such work. There were seven offences on record against Lawson, but on five of these occasions he was either bound over or put on probation; all the cases except the last had occurred before he was 18. He had shown no signs of violence at Rampton Asylum; his transfer to Calderstones indicated a progressive improvement, and it was reasonable, in view of his recent history, to let him out for a short time to see how he behaved under proper supervision. The committee had seen and questioned the brother; it considered the accommodation and supervision would be adequate. Finally it was urged that the two doctors had acted upon honest belief based upon their medical skill and experience. Error of judgment was not negligence. The jury, however, awarded £3500 to Mrs. Holgate and £708 to her husband. The defendants had paid £2000 into court with denial of liability. This sum was ordered to be paid out to Mrs. Holgate in part satisfaction of her award, and judgment was given in accordance with the jury's findings. As the judge observed in the course of his summing-up, it is easy enough to be wise after the event.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

BY TWELFTH MAN

III

Sir Auckland Geddes advised his medical audience in Edinburgh to cease "their fear of the non-rational." Such advice might be thought superfluous in our day when the behaviourists maintain that there is no non-material element in our make-up, when determinists declare that we are impelled by a vis a tergo which is both incalculable and irrational, and when the Freudians insist that our conduct is determined not by reason or free-will but simply by our instinctive desires. He was not, however, urging the claims of irrationalism as a satisfactory philosophy but pointing out that there are many facts and many phenomena which reason cannot elucidate. Such a view has become a commonplace of twentieth-century science. Modern men of science, says Bertrand Russell, "believe that ascertainable truth is piecemeal, partial, uncertain, and difficult." It is possible to be grateful for this new-found humility of the scientists while still believing that reason remains man's guide to as much truth as is ascertainable, that his reason is free and may still be used to control his instinctive desires.

* * *

G. K. Chesterton in his autobiography has an amusing description of the discussion which took place in the village of Beaconsfield concerning the nature of the proposed war memorial. G. K. C., as might be expected, argued strongly for a cross but the "local doctor, an admirable physician but a sceptic of rather a schoolboy sort, observed warmly, If you do put up a thing like this, I hope you'll stick a light on it, or all our cars will smash into it in the dark."

This is a perfect illustration of the practical, the materialist approach to life's problems which is the normal attitude of the doctor. There is no need to defend this outlook in a medical journal; its virtues shine for us like a good deed in a naughty world. The limitations of such an approach are less obvious, for we are mostly "sceptics of rather a schoolboy sort." We were trained to believe that the intangible was non-real, the invisible non-existent, and what we could not explain was not merely inexplicable but irrational also.

It is difficult to slough off habits of thought which have dominated us for generations, but if, while still retaining unrepentantly our belief in rationalism as a working-day philosophy, we could acquire something of the spirit of our modern physicist-philosophers, we might get with it incalculable gain. "Come down to brass tacks," declares our Beaconsfield doctor, "granted that there is this new spirit in modern science, what can it profit clinical medicine which has no concern with the fourth dimension?" While we await an answer to this pertinent question from some undiscovered clinical genius, let me attempt an inadequate reply. I believe that in each age there are a few dominating ideas which permeate and fashion the thought of the day. These ideas are valuable not because they enunciate fresh truth but because they reveal new aspects of truth. I believe that clinical medicine stands to-day in urgent need of such reinterpretation. There are hosts of new facts, imperfectly digested, which demand new generalisations and such generalisations would alter profoundly our conception of disease processes in the individual. But even if this new comprehension is denied us, I think the modern scientific spirit might still do much for us. It would make us more receptive of new ideas in medicine and more distrustful of new remedies. It would make us less satisfied with the diagnostic labels which we attach to patients and less disappointed if a piece or two of the jig-saw puzzle is missing, as it so often is. It would help us to look at disease constitutionally, to regard it as a reaction of the whole man, mind and body—an individual reaction. It would kill forever those monstrous text-books of differential diagnosis that depend on an analysis of symptoms—katabolic and not anabolic. It would give us a juster appreciation of the results of laboratory research and an enhanced ability in the fitting of these new facts into the mosaic of our clinical conceptions. It would make us more critical of our own dogmatism, more aware of our enormous capacity for self-deception. It would keep Cromwell's cry ringing in our ears, "Gentlemen, I beseech you, by the bowels of Christ, to remember that you may be mistaken." This would be no mean harvest. I may be wrong, but I think it has been possible to see the stirrings of this new spirit during this last decade.

* * *

The recent death of Miss Moberley recalls an incident which illustrates well our changed attitude to non-rational experiences. Thirty-six years ago[1] Miss Moberley and Miss Jourdain were on holiday in Paris. They were women of high intelligence and the successive principals of St. Hugh's College, Oxford. Neither of them had any specialist knowledge of French history. They were walking one afternoon in the grounds of the Petit Trianon at Versailles when they were met and addressed by persons wearing the costume of 1789; some of those persons were visible to one of them, others to both. They passed by woods that no longer exist; saw a man sitting by a kiosk which has disappeared long ago; and were accosted by a footman who emerged from a door in the palace which, through the destruction of a staircase, was built up nearly a hundred years ago. At the time the ladies noticed nothing peculiar in their experiences beyond a strange feeling of depression. It was only when discussing some weeks later the events of the afternoon that they became impressed by the strangeness of what they had seen. Patient research in the years that followed revealed that the geography of the place, as they described it, was as it had been in the days of Marie Antoinette, that the lady seen by Miss Moberley was Marie Antoinette herself; that the dresses were in detail what they would have been in 1789. There is much quietly described corroborative detail in the book; it makes fascinating and unusual reading.

It is not difficult to imagine what the general reaction to this recital would have been thirty years ago—but to-day J. W. Dunne, in an introduction to the book, writes, "Hence, if Einstein is right, the

[1] "An Adventure." By C. A. E. Moberley and E. F. Jourdain. London. 1931.

contents of time are just as 'real' as the contents of space. Marie Antoinette, body and brain, is sitting in the Trianon garden now. What does that 'now' mean? It is a four-dimensional 'now,' such as would be employed by a super-mind which could perceive Marie Antoinette and you (who are reading this) as equally present to perception. . . A dreamer's attention can travel to and fro in the physicist's alleged four-dimensional 'time' . . . . Granted this absorption in that particular part of the past, anyone who is capable when awake of mental 'time-travelling' combined with telepathy would be likely to see what these two ladies saw through the eyes of any persons who walked in that garden in the year 1789."

* * *

This adventure has one curious interest for the physician. It resembles the sort of visual and auditory auræ which sometimes accompany an epileptic fit. James Collier described thus the aura of a patient of his "who suddenly found himself approaching a level-crossing in a picturesque village in high sunlight. Out of the little guard-house on the farther side came a woman dressed in the conical beaver-hat and scarlet cloak of the Welsh national dress, who greeted him with a smile. He hastened forward to meet her but found the gates rapidly closing upon him. As they closed, but before they touched him, he lost consciousness. In this case the hallucination was always the same in every detail and in each fit." Moreover, both Miss Moberley and Miss Jourdain experienced an "extraordinary depression during the incident which in spite of every effort steadily deepened." I am not suggesting that both these ladies had epileptic attacks with an identical aura and at the same moment, but would our physicist-philosophers regard an epileptic attack as an explosive escape into fourth-dimensional time?

* * *

The rôle of the expert in human affairs becomes an increasingly important one. With its increasing importance comes a distressing tendency for the expert to pontificate outside his own subject. When I read statements taken from experts found wandering but still capable of speech, I recall the remark of Hanoverian George as he surveyed his troops before battle: "I don't know what they'll do to the enemy but, by God, they frighten me."

The expert who uses his reputation to buttress an opinion which does not rest on the foundation of his special knowledge sins against the light. Examples of this occur readily to the mind. Doctors err frequently in the law courts, where the expert medical witness is easily tempted. One of the less offensive instances was that of a distinguished forensic pathologist who gave his opinion as to whether or not the sound of a falling body could have been heard by the driver of a car. It matters not at all whether the medical jurist was right or wrong because his evidence on such a matter is of the same value as the least intelligent layman—neither more nor less. But to-day the opinion of doctors is invited, both individually and collectively, on many matters outside a court of law which are of national, social, and political importance. An enumeration of such subjects would include malnutrition, population, the birth-rate, birth control, noise, tests for drunkenness, road accidents, the campaign for physical fitness, corporal punishment, euthanasia, war and peace, and many another problem, even when specific questions of public health are excluded.

If doctors are to express an opinion on these and kindred subjects there will be general agreement that they should abide by the rules governing the conduct of experts on such occasions—viz.: (1) they should have a specific contribution to make; (2) this contribution should rest on facts within their own knowledge and that of their colleagues; (3) if their opinion should not coincide with informed medical opinion it should be so stated; (4) if the subject should be one on which they have no expert knowledge it should be made clear that they are expressing an individual opinion which is of equal value with the opinion of Mr. Smith. Although no one will quarrel with these rules, I think it could be shown, if one had the time and a gift for patient research, that doctors, both individually and collectively, have published on all the subjects mentioned above, opinions which are no more than the expression of a personal bias. I recall two recent examples of this.

* * *

There is a suggestion, as all my readers know, that the level of the alcohol in the blood should be used as a test of incapacity to drive in persons charged with being drunk in charge of a car. Some years ago an eminent surgeon, who is also an ardent temperance propagandist, wrote to the *Times* a letter which introduced this subject for the first time to the general public. The *Times*, obviously impressed with our colleague's surgical distinction, printed his letter in the place of honour on the middle page and his readers were, no doubt, equally impressed by his propaganda on behalf of this test. They did not know, for he did not tell them, that while biochemical assays are sufficiently difficult to interpret in the courts of medicine, in the courts of law they darken counsel and confuse judgment. They did not know, nor did he tell them, that as a test for driving incapacity such examinations have, in the opinion of many doctors, about the same value as the olfactory evidence of an anosmic constable. Nor was he content with this, but he popped nimbly over a neighbouring hedge into the lawyer's field and said that any man who refused to have such an examination made when charged with such a misdemeanour stood almost self-convicted! This remark must have caused laughter in the Inns but terror in the public-houses—which was perhaps what our temperance propagandist intended.

* * *

A well-known physician wrote to the *Times* a few weeks ago insisting that the cause of gastric disorders in London busmen was an insufficiency of vitamin B in their diets. This I should take to be in flagrant disregard of rules 2 and 3 quoted above. Let the busmen eat brown bread. Their ulcers would be prevented and, we might infer, the buses would quickly be rolling down Regent-street again. Vitamin B not only cures constipation, prevents intestinal cancer, but it is also a dramatic solvent of industrial disputes. Next day, to his great indignation but to my great delight, he was confronted by another gentleman also straying from his own field. A distinguished member of the advertising business (not, let me hasten to assure the cynical, of our own profession) replied to him in a letter which outlined concisely orthodox medical opinion on the subject.

Sir A. B., a physician of repute,
Went out to settle Bevin's bus dispute.
Too bad. He met Sir Advertising Jim,
Who, without much ado, did settle him.

CORRESPONDENCE

THE OVER-TREATMENT OF GONORRHŒA

To the Editor of THE LANCET

SIR,—Mr. Nicholls's letter in your issue of March 20th was one that has long required writing, and I should like therefore to congratulate him on his courage in attacking an evil which we all recognise. I fear however that unless a miracle happens his voice will be as "the voice of one crying in the wilderness," for the root of the evil lies rather in the system of treating venereal disease than in the individuals practising it. He puts his finger on the weak spot when he says: "gonorrhœa has been withdrawn from the circle of hospital life and wedded to syphilis (an unhappy and incompatible match), and they live apart in a dark and uncritical world of their own."

The trouble is the training of the venereal specialist, and it is a curious irony of fate that this odd hybrid, whom Mr. Nicholls so justly condemns, should have been made possible by John Hunter, the greatest name in British surgery, and the greatest name on the staff of Mr. Nicholls's own hospital. Hunter, experimenting on himself in 1767, persuaded the world that syphilis and gonorrhœa were the same disease. It was therefore logical for one man to specialise in this disease. Philippe Ricord exposed the fallacy in 1837, yet we still talk about "venereal disease" in the singular; and we still seem to think that two dissimilar diseases—one, according to Osler, requiring the widest possible knowledge of internal medicine, the other obviously needing an expert acquaintance with urology—can be adequately treated by a junior official with very limited experience of either.

Venereal disease has always been the cinderella of medicine, and the only hope of rescuing it and its exponents from this lowly position is to restore syphilis to general medicine and add gonorrhœa to urology, the branch of surgery to which it logically belongs.

At present the treatment of venereal disease is a blind-alley occupation. Those in charge have no chance of promotion to the medical or surgical staff of their respective hospitals. They have no incentive to enlarge their horizon, and as a consequence the following is the sort of thing that happens. A patient was treated for six months with sounds as a case of stricture. At the end of this period, getting no better, he was seen by a urologist who passed a cystoscope without any difficulty, and discovered he had cancer of the bladder which by this time had become inoperable. Anyone with the most elementary knowledge of surgery could not have committed such a tragic blunder; yet it happened at one of our best known venereal clinics. It is inadequate surgical training that makes possible the over-treatment by irrigation and the mangling of urethras with dilators that one now sees going on in so many of our venereal clinics. Such treatment would not be possible in any clinic where men with real surgical minds are in control. A man professing to be an expert on gonorrhœa ought to be able to use a cystoscope, do an internal urethrotomy, or operate on a prostatic abscess instead of allowing it to burst. He ought to be able to do a salpingectomy or cure a cervical tear when necessary.

How many of our so-called venereal experts are capable of performing these simple operations? Hardly any. And the reason is that they have been trained on entirely wrong lines, acquired the mental outlook of the old dead and gone regimental medical officer instead of that of the urologist. Is it too late to hope that the treatment of gonorrhœa may be rescued from the dead hands of this "service" tradition, and allowed to develop on sound surgical lines? I am, Sir, yours faithfully,

J. JOHNSTON ABRAHAM.

Queen Anne-street, W., June 14th.

DIAGNOSIS AND TREATMENT OF GASTRIC AND DUODENAL ULCER

To the Editor of THE LANCET

SIR,—I should like to suggest to Dr. Duncan Leys that he should use a really delicate test for occult blood for a year. I am convinced that he would never go back to the rough methods used in most English laboratories. There is no analogy between the Fehling reaction for sugar and the tests for occult blood, because normal urine contains traces of sugar, so that a test is required which gives a positive reaction only with a percentage of sugar greater than normal. But normal stools contain no blood if there is none in the food, so the more delicate the test the more valuable is the information it gives. Every year I see at least half a dozen cases of cancer missed and numerous patients with an active ulcer said to be healed because a report of no occult blood has been received, although when the examination is repeated with Dr. Ryffel's technique [1] it is positive. Properly done, a positive occult blood test is of more value than a negative X ray examination, as it is positive in *every* case of cancer of the alimentary canal, and it rarely becomes negative with gastric and duodenal ulcers until after the niche has disappeared. It therefore shows the need for further investigations in suspected cases of cancer of the stomach and colon when the first X ray report is negative, and it gives the best indication we have as to when an ulcer has healed—short only of gastroscopy in the case of gastric ulcer.

The guaiac test has the great advantage over the benzidene test in giving no reaction with iron, whereas the latter is useless in the many cases of ulcer in which the presence of anæmia calls for the administration of iron, and the spectroscopic examination of a fæcal extract for hæmatoporphyrin and acid hæmatin gives additional information of the greatest value. I am, Sir, yours faithfully,

ARTHUR F. HURST.

New Lodge Clinic, Windsor Forest, July 14th.

SULPHÆMOGLOBINÆMIA AND METHÆMOGLOBINÆMIA AFTER SULPHANILAMIDE

To the Editor of THE LANCET

SIR,—In view of the communication of Dr. Paton and Dr. Eaton in your issue of May 15th and their letter published on June 5th, the following case in which sulphæmoglobinæmia and methæmoglobinæmia developed after the administration of Prontosil appears to be of interest.

A man aged 41 was admitted to Guy's Hospital on March 11th, 1936, for a chronic empyema of three months' standing. A rib was resected on March 18th and 3 pints of pus were drained off. The pus was sterile on culture. The patient made satisfactory progress until March 27th

[1] *Vide* Price's "Medicine," 4th ed., 1933, p. 605.

when he developed an acute tonsillitis. Hæmolytic streptococci were grown from a throat swab. On March 31st the patient had a venous thrombosis in the left leg and on April 3rd he began to have rigors. On April 4th he developed arthritis of the right wrist and a blood culture at this date gave a heavy growth of hæmolytic streptococci. On April 6th the hæmoglobin was 58 per cent. and the white count 11,000 cells per c.mm.

From April 6th to the 13th 5 c.cm. of prontosil was given intravenously each day and 2 tablets of prontosil per os t.d.s. After April 13th no further injection was given, but the patient continued to take the tablets per os for a further few weeks. On April 9th the temperature remained normal and the patient was very much better. The white count rose to 22,000 cells per c.mm. and a blood culture on April 15th was sterile. During the severe stages of the illness the patient had a livid complexion, but this was attributed to the septicæmia.

Progress continued to be satisfactory until May 16th when the temperature began to rise again up to 100° F. each day. On May 20th the patient complained of pain in the right groin and later this spread to the knee. On examination there was evidence of psoas spasm and tenderness in the right groin and right loin. The presence of a psoas abscess was suspected. On June 10th treatment with prontosil tablets was recommenced. The patient then became obviously cyanosed, the lips, ears, and facial venules being of a leaden-blue colour. There was no dyspnœa and the patient appeared unusually well in himself. Enterogenous cyanosis was diagnosed and on June 15th Dr. J. H. Ryffel examined the blood and reported: "The laked blood shows an absorption band in the red which gets smaller but does not disappear on addition of ammonium sulphide. The band appears to be due to a mixture of methæmoglobin and sulphæmoglobin."

Besides prontosil the patient had been having, amongst other drugs, magnesium sulphate and phenacetin. On June 14th all these drugs were omitted. On June 21st the hæmoglobin was 27 per cent. At this date the patient's colour had much improved, although the cyanosis was still marked. Dr. Ryffel again examined the blood on June 26th and reported: "The blood still shows a well-marked band in the red not altered by ammonium sulphide. Therefore sulphæmoglobinæmia only." In the meantime œdema developed in the right loin and right thigh and it was thought desirable to perform an exploratory operation. In view of the patient's general condition he was given a blood transfusion of 300 c.cm. on June 26th and a second transfusion of 500 c.cm. on June 30th. On July 2nd a large psoas abscess was drained in the thigh. Hæmolytic streptococci were grown from the pus. Following this the patient made satisfactory progress culminating in his discharge from hospital.

I am indebted to Dr. E. P. Poulton under whose care the patient was, and to Dr. Ryffel for permission to publish this case.

Methæmoglobinæmia and sulphæmoglobinæmia in the same patient has also been described by L. P. Garrod (*Quart. J. Med.* 1925, **19**, 86). In this case the methæmoglobinæmia was believed to be superadded to the enterogenous picture by the excessive use of headache mixture and cleared up immediately on the discontinuation of the drug.

I am, Sir, yours faithfully,

J. A. J. HAMMOND.

Guy's Hospital, S.E., June 9th.

TREATMENT OF ACUTE OSTEITIS

To the Editor of THE LANCET

SIR,—Owing to absence from home I have only just read Mr. Saint's interesting lecture on Acute Osteitis, published in your issues of May 22nd and 29th. His reference to a contribution of mine on the subject calls for some comment although I cannot here discuss all the points raised. If anyone who is interested will refer to my article they will find that two of the three patients who died were suffering from virulent septicæmia, and that immediate operation was undertaken because, at that time, I did not realise the value of delay in such cases. I am not suggesting that, with expectant treatment, the outcome would have been different, but I do wish to emphasise that the initial septicæmia is by no means always mild, as Mr. Saint appears to suggest, and that a few days' pre-operative treatment may be a life-saving measure. In this connexion is there no one who can find the records of Mr. Tyrrell-Gray's cases? They might be of great value. Since my article was published I have treated nine more cases on similar lines without a death.

On the exact extent of the local operation I do not wish to dogmatise, but I am convinced that harm has been done in many cases by too radical interference. Our first object, in a disease with a mortality so potentially high, should be to save life. The principles of treatment should be operation at the right moment, which, in my opinion, should not be within a few hours of diagnosis, adequate fixation of the part, and infrequent dressing, which can be secured by using B.I.P.P. As regards the latter agent, I am in whole-hearted agreement with Mr. Saint, having used it constantly after my first trial of it in Mesopotamia in 1916.

The subject of acute osteomyelitis has been up for discussion at medical meetings on many occasions. I would suggest to Mr. Saint that a statistical investigation by the Association of Surgeons, into the results of various methods of treatment, would be of considerable interest.

One final question, can Mr. Saint give us the approximate duration of illness, in each case, before he operated?

I am, Sir, yours faithfully,

Northampton, June 14th. C. C. HOLMAN.

A DEBT OF HONOUR

To the Editor of THE LANCET

SIR,—The Southern Spanish Relief Fund, whose hospitals for children in Almeria suffered severely in the recent German bombardment, appealed through your columns on March 13th for the voluntary assistance of doctors. Five applications, in all, were accepted, after irreproachable references from colleagues had been received, and after two of the applicants had been interviewed by a leading London doctor. Four of these five had successively to be repatriated in their own and our interest, leaving us with liabilities which amount in all to over £200.

I honour the kindly reluctance of reference-writers to give information that will prevent acceptance of a colleague's application, but I hope that your readers may feel the same kindly reluctance to let a compatriot suffer serious loss thereby. For I feel it impossible to charge expenses of the character incurred to a fund raised for the Spanish wounded, women, and children. Failing help they will have to be met from a private purse already depleted by running, and raising money for, the hospitals. Any subscriptions for the relief of this personal liability should be marked "medical" and addressed to: E. T. Mardling, Esq., F.C.I.S., The Hon. Treasurer, Southern Spanish Relief, 10, Old Jewry, E.C.2. Should they exceed the total liability, subscribers will be consulted as to the refund or redisposition of the balance.

I am, Sir, yours faithfully,

GEORGE YOUNG,

Director of British Hospitals, Almeria and Murcia.

PREGNANCY TOXÆMIA

To the Editor of THE LANCET

SIR,—I have read with some interest Dr. Theobald's paper in your issue of June 12th. Important as minerals and vitamins are to the economy—even in the non-pregnant—I do not think their exhibition in pregnancy plays the part which Dr. Theobald would have us believe. From his own account these substances do not prevent the occurrence of the pregnancy toxæmia, for signs appeared in 13 out of 50 cases treated. Since the incidence was much greater—more than twice as great—in the 50 not so treated, suggesting some effect, we must either conclude that the doses in the first 50 were insufficient, or that some other cause than a deficiency of these substances is at work in the production of the toxæmia of pregnancy.

Unfortunately, in his present paper, Dr. Theobald does not consider other possible causes. He talks of the different protective substances associated with toxæmic symptoms. Attributing the difference in the incidence of "complications" in his two groups to the substances given in the one and withheld from the other, he asserts that the results of the dietetic treatment of these patients in the antenatal ward strengthen his assumption. "The symptoms," he says, "cleared up in every case." He believes, apparently, that these cases cleared up because of the dietetic treatment, and because of that alone. But, presumably, these patients were kept in bed; if that were so, the effect of rest in bed, per se, finds no place in his argument.

I do not propose to dissertate here on the effect of rest in bed; it will be admitted that rest in bed has some effect—even in patients suffering from the toxæmia of pregnancy. But it does not matter whether Dr. Theobald's patients were kept in bed or not; I know from my own experience that putting toxæmic patients to bed and feeding them on water only—and in restricted quantity (to begin with 1 pint, or 1½ pints per 24 hours) flavoured with a little lemon and given a little glucose—restores these patients to the normal; the œdema disappears, and presumably the blood pressure if raised goes down. I give them no especial vitamins and no calcium; yet they get well. The treatment is essentially physical: combined with starvation. But to-day, when every disease is attributed to some biochemical aberration, and the patient is treated by the exhibition of some tablet or capsule, I do rather wonder whether the effect of rest in bed will be allowed to be a physical one. But if rest in bed acts physically, how does it do so? I state categorically that rest in bed, per se, prevents the toxæmia of pregnancy. It is for your readers to answer how it does so.

In line with this we find that dietary deficiency in pregnancy occurs without the appearance of the pregnancy toxæmia. Anæmic pregnant women appear immune from the toxæmia of pregnancy. Truly, eclamptic women are anæmic; but that is a result of the visceral impairment, not the cause of that impairment. In the same way we see that postpartum hæmorrhage is never followed by postpartum eclampsia. . . . How does venesection prevent eclampsia—whether ante- or post-partum? By producing an anæmia? By its chemical or its physical effect? The danger of removing too much blood postpartum is puerperal sepsis; not the toxæmia of pregnancy (e.g., eclampsia). Truly, the biochemical ingredients of the blood are of importance; but not in the prevention of the toxæmias of pregnancy.

May I remind your readers that man consists of a mass of cells, &c.; that both the cells and the juices possess very definite physical qualities; and that not one of the vital functions goes on without the play of physical forces which the cells of the body engender; and that when these physical forces are insufficient or too great, physiological processes are disturbed, and interfered with. This is even so in the pregnant woman; it occurs irrespective of biochemical (vitamin) influences; it is a factor which those desirous of understanding the toxæmia of pregnancy and its prevention will be forced—by the *reductio ad absurdum* argument if by no other—sooner or later seriously to consider.

I am, Sir, yours faithfully,

Rugby, June 11th. R. H. PARAMORE.

To the Editor of THE LANCET

SIR,—It is now over six years since I advocated in the *British Medical Journal* the continuous administration during pregnancy of calcium phosphate 15 grains thrice daily, together with a plentiful supply of green vegetables. I *was* and still am of opinion that the toxæmias of pregnancy are deficiency diseases.

The case for the continuous administration of calcium during pregnancy seems unanswerable. For nine months there is an enormous demand on the mother to provide calcium phosphate for the bones of the fœtus; this demand has to be met in some way, either by an increased intake of calcium or by drawing on the mother's reserve of calcium, with disastrous consequences for both mother and child. Another well-known fact is that there is a seasonal variation of the phosphorus and calcium content of the blood, the percentages being highest during the months of maximum sunshine; therefore during the winter, and especially the months *following* the winter, there is greater need of calcium than ever. This need for calcium coincides with the greatest incidence of eclampsia, according to Harrer of the New York Lying-in Hospital, who has shown graphically the incidence of eclampsia during ten years, and considers that the increased incidence in early spring is due to the cold and damp weather prevailing at that time (Williams's "Obstetrics").

We know that in chronic parenchymatous nephritis the calcium content is low, that nephritis and œdema have been successfully treated with calcium, and that calcium has a sedative effect on the nervous system and diminishes the permeability of the blood-vessels, and we know that in some cases of uræmic convulsions the blood calcium is low. We know also that one cause of tetany is calcium deficiency, and curiously enough it has been noted that epidemics of tetany usually occur in the spring. These and many other reasons seem to indicate that large doses of calcium, in addition to the vitamins, are required to make up the maternal deficiency, and to prevent the so-called "toxæmias" of pregnancy. If in spite of these measures the patient shows signs of hyperemesis I would advise, in addition to the calcium phosphate and vitamins, giving dilute hydrochloric acid, preferably in the form of betaine hydrochloric and pepsin, of which there are several preparations on the market.

I am a little disappointed that this treatment has not been tried out on a large scale before. I had hoped that someone would have given it an extended trial before now, and I trust that Dr. Theobald's interesting paper will lead to a real and thorough test.

I am, Sir, yours faithfully,

Isle of Anglesey, June 14th. J. L. MOIR.

MOYNIHAN MEMORIAL

To the Editor of THE LANCET

SIR,—The board of the General Infirmary at Leeds realise that the greatest memorial to the genius and work of the late Lord Moynihan must always be advancement in the art of surgery, which he did so much to promote. They feel, however, that it is their duty and privilege to perpetuate a record of Lord Moynihan's work for surgery and his labours in and for the General Infirmary at Leeds by the erection within its walls of a suitable memorial. Already a ward has been named the "Moynihan Ward," but much more than this is clearly required. The board have appointed a committee to submit and carry out a suitable scheme, and on behalf of this committee I am able to state that the sum of £750 has already been received. More than this is needed if the memorial is to be adequate and I am authorised to invite subscriptions from medical and lay sympathisers. It is suggested that one guinea would be a suitable amount, though more or less would be very acceptable.

Subscriptions should be forwarded to the General Infirmary at Leeds in the name of the "Moynihan Memorial Fund" or to myself. They will all be very gratefully acknowledged.

I am, Sir, yours faithfully,

CARLTON OLDFIELD,
Chairman, Moynihan Memorial Committee.

June 14th.

BICENTENARY OF THE BRISTOL ROYAL INFIRMARY

To the Editor of THE LANCET

SIR,—Sunday next, June 20th, marks the completion of 200 years' work at the Bristol Royal Infirmary: for on this day in 1737 the out-patient department was opened for the reception of patients, though the formal opening did not take place until December of that year. We feel that the bicentenary of the oldest provincial teaching hospital in the Kingdom is a matter of more than local interest and importance. To mark the occasion a carnival is being held at the Clifton Zoo from July 7th to 10th. The formal celebrations will take place later in the year, probably early in October, when it is hoped that former students and others associated with the infirmary will make a special effort to be present.

I am, Sir, yours faithfully,

E. WATSON-WILLIAMS,
Hon. Secretary, Bicentenary Celebrations Committee.

Clifton, Bristol, June 14th.

THE LANCET 100 YEARS AGO

June 17th, 1837, *p.* 448.

From an answer to a Correspondent.

Corporal Ward.—Were it a necessary consequence of the inversion of images on the retina, that the *mind* should perceive them to be upside down, then it might be correct to speculate on the cause of their being recognised in an upright state. But the upside-down result has not yet been proved to be inevitable. Every theorist, however, appears to have forgotten this. Be the image pictured in whatever position it may on the retina, the mind clearly recognises the lower end to be the lowest, and the upper to be the highest, but *why* it does so, it is as unnecessary to debate as the question, how the mind comes to be sensible that the representation of an object exists on the retina at all. The opinion that the "change of flanks is effected by the decussation of the optic nerves," is not new, but has often before been hazarded. Experiments and not conjectures are needed in physiology.

A NEW MENTAL HOSPITAL

ON Monday last, Sir Kingsley Wood, the Minister of Health, opened the new mental hospital at Runwell, Essex, which has been provided jointly by the county boroughs of East Ham and Southend-on-Sea. Erected at a cost of £650,000 it has been planned so as to combine all the previous advances in mental hospital design, including a separate admission hospital, four research laboratories, a general library, and a recreation hall equipped with gymnastic apparatus. There is also a new feature—a detached "closed unit" for disturbed cases.

Everything has been done with the aim of convincing both patients and public that nervous and mental disease must be treated with "the same intensive care, scientific means, and human understanding as any physical disorder." With a site of 500 acres between Wickford and Rettendon (about 24 miles from East Ham and 12 from Southend) the buildings have been placed on a slight slope open to the south and sheltered by rising and well-wooded ground on the north. They are widely spaced, and "in this way it is hoped that an atmosphere may be engendered of light and airy buildings without obtrusive restraint, and with a freedom from the 'institutional' feeling. Wide verandahs with large solaria form a feature of the patients' units, and airy rooms with french windows enable them to feel that they are in a sanatorium rather than a great institution."

Occupational therapy is considered a very important part of the treatment to be provided, and provision has been made for teaching many different handicrafts, as well as upholstery, printing, tailoring, boot-repairing, metal work, and carpentry. The admission hospital is built in a single storey and affords every facility for open-air treatment. In this unit is the X ray department, the pathological and biochemical research laboratories, a department of hydrotherapy, and laboratories of experimental psychology and clinical pathology. Two detached villas, at a distance from the other buildings, are for voluntary patients suffering from the milder forms of mental disorder; they allow of as much freedom and privacy as possible and they are described as the first of their kind in a public hospital. Units for quiet and employable patients are provided with large gardens and are connected by covered ways with the occupation therapy shops. There are also three parole units for patients not needing much supervision and able to enjoy more freedom both inside and outside the grounds. They have easy access to the kitchen garden, laundry, and farm, where a certain number of the patients will be employed. Finally there is the "closed" unit, situated well away from the other buildings, accommodating 60 male and 100 female patients suffering from the more severe forms of mental disorder. This is planned to be unlike the old-fashioned "refractory block" and will have a large garden.

The hospital has room for 1010 patients, and forms a community of perhaps 1400 people with 25–30 separate units. The physician superintendent is Dr. Rolf Ström-Olsen, the deputy superintendent Dr. S. M. Coleman, the senior physician Dr. S. L. Last, and the assistant physicians Dr. M. B. Brody and Dr. F. P. Haldane. There are also two resident house physicians. The visiting consultant staff are: Dr. T. Rowland Hill, Mr. Rodney Maingot, Dr. I. Vitenson, Mr. J. Lyle Cameron, Dr. H. E. Bonnell, Mr. G. G. Talbot, Dr. G. White Phillips, and Mr. W. Milton Bull. The architects of the new building are Messrs. Elcock and Sutcliffe.

BRITISH ASSOCIATION OF RADIOLOGISTS

AT a meeting of this association held at the British Institute of Radiology on June 11th and 12th, under the presidency of Prof. J. M. WOODBURN MORISON, the Skinner lecture on the

After-care of Patients Suffering from Cancer of the Breast

was delivered by Dr. F. HERNAMAN-JOHNSON. After drawing attention to the increase in the death-rate from carcinoma of the breast during the last thirty years, the speaker gave it as his opinion that little advantage was likely to accrue from the adoption of heavy dosage methods of radiation therapy in this field, and that radiation therapy should be employed primarily as a palliative measure following radical surgery. The objects to be attained in palliation were first to free the patient from any external signs of the growth, secondly to relieve pain and discomfort, thirdly to delay the onset of and, if necessary, treat metastases, and lastly to treat the patient from a psychological point of view. In this respect attention was drawn to the value of surgery where the patient was more likely to feel that the growth had in fact been completely removed. Reference was made to Dr. A. T. Todd's work, but Dr. Hernaman-Johnson did not consider this suitable for hospital patients. Referring to biochemical tests he was of opinion that the differential sedimentation-rate, while not of value in diagnosis, was useful in assessing the response to treatment. Isolated skin recurrences should, he thought, not be regarded as of grave importance; heavy dosage should be employed locally. Axillary recurrences should be removed surgically, while supraclavicular gland metastases should be dealt with by heavy doses of X ray therapy. Metastatic deposits in bones were worth while treating, and in such cases Todd's method should be employed. Thoracic invasion rarely responds and the prognosis with liver metastases should be regarded as quite hopeless.

Wave-length in Radiotherapy

Mr. G. F. STEBBING, opening a discussion on wave-length as a factor in radiotherapy, emphasised the fact that in this form of treatment results were obtained only when the dosage was carried to a level which produced a fairly severe reaction on the skin, and that all factors which might contribute to a lessening of this reaction were worthy of consideration. It was almost universally accepted that the same physical dosage measured in röntgens (*r*) produces less normal tissue damage when delivered by radiation of short wave-length. Despite this lesser biological response of the normal tissues Mr. Stebbing was of opinion that so far as malignant cells were concerned the reverse was the case and that using short wave-length rays a more lethal effect on the tumour was obtained. This view was based primarily on the belief that the action of the radiation on the tumour cells is direct and not through the tumour bed. In addition to this "selective" action the use of short wave-length rays as produced by higher voltages resulted in greater penetration and so an improved depth dose which, though numerically not of a high order, was in many cases of very great value. Thus an absolute gain of 5 per cent. per field resulted in a total gain of 30 per cent. if six ports of entry were employed as in many cross-fire methods.

Dr. DOUGLAS WEBSTER, on the other hand, while admitting that the use of higher voltages enabled a greater depth dose to be obtained, pointed out that a similar result could be obtained by the use of greater treatment distances. He did not consider that there was any selective or specific action in relation to wave-length, and in support of this view he pointed out that from the physical point of view ionisation effects did not run parallel to the wave-length of the radiation and that, from the practical aspect, the measurement of the *r* at the higher voltages was a matter of some difficulty. On the biological side he quoted a number of experiments in which the employment of radiation generated at widely different voltages had failed to produce any different response on the part of the biological medium. On clinical grounds there was, as yet, no concrete evidence to support the view that better results were obtained by the use of higher voltages and that clinics employing X rays generated at potentials of 600 kv had not produced results superior to those obtained at 200 kv.

Dr. RALSTON PATERSON, supporting Dr. Webster, was of opinion that short wave-length rays were, as a rule, to be preferred since their use entailed less skin reaction for the same measured dosage. This advantage, however, he considered to be due not to any specific or selective action on malignant tissue but to some physical factor as yet undetermined and possibly related to a defect in our present measurement methods.

Dr. STRUTHERS FULTON did not consider that radiation effects were due to any specific or selective action. Clinically similar and equally satisfactory results were obtained in skin malignancy by the use of long wave-length X rays on the one hand and gamma rays on the other. The fact that with X rays these results were obtained at relatively lower dosage levels as measured physically in röntgens tended to support the view held by Dr. Paterson that our present methods of measurement might, in time, require to be revised.

Dr. R. E. ROBERTS, arguing against there being any selective action, pointed out that if long wave-length rays produced a greater effect on the skin it was reasonable to assume that they would also produce a greater effect on tumour tissue.

Dr. F. ELLIS cited a number of clinical and biological experiments from the literature, all of which tended to show that no selective action in relation to wave-length did in fact exist.

Mr. STEBBING, replying, pointed out that skin tumours were, as a rule, sensitive, and that care must be exercised in drawing deductions from this material. With deep-seated tumours the difficulty was greater and it was in the treatment of such cases that the value of short wave-length rays was most apparent.

Low Voltage Near-distance X Ray Therapy

Dr. S. B. ADAMS, after outlining the particular merits of this form of treatment, proceeded to describe two special applicators which had been devised at the Royal Cancer Hospital with a view to providing a more homogeneous distribution of energy on the skin surface than that obtainable with the standard applicators. He discussed the question of dosage, illustrating his remarks by slides of clinical subjects successfully treated by this method. Clinical and biological problems in relation to the factors of time and intensity were being investigated, but it was as yet too soon to put forward any definite results.

Dr. J. F. BROMLEY considered the possibilities of the method in the treatment of lesions in the mouth and in carcinoma of the rectum. The particular merit of this method in the treatment of skin malignancy in the region of the eye was demonstrated by a series of slides showing clinical results. Dr. Bromley also briefly outlined certain biological experiments on which he was engaged.

Prof. MORISON emphasised the importance of considering the dosage at the tumour level. The profound effect which distance has in modifying this was graphically demonstrated as was, also, the comparatively small gain in depth dose associated with the use of higher voltages. An interesting table was shown comparing, from the point of view of energy output and distribution, radiation from a radium bomb, a radium applicator, an X ray tube operating at 200 kv and a short distance X ray tube operating at 60 kv. Prof. Morison discussed the possible difference in biological response to split dosage, continuous and massive methods of treatment. During treatment the tissues gradually changed in their sensitivity to radiation. Tumours tended to become radio-resistant and he was, therefore, experimenting with a method whereby the daily dose was gradually increased throughout the period of treatment.

Dr. R. MCWHIRTER thought that similar results could be obtained by the employment of a tube operating at the 200 kv level. He had, further, found the single day massive dose method quite satisfactory for the treatment of skin malignancy.

Dr. FULTON was of opinion that the near-distance X ray therapy plant provided something which could not be duplicated by any other apparatus at present available. While approximating in energy distribution to a radium plaque it gave a very much higher output. On the other hand, a high voltage X ray tube, while providing a high output, gave a more profound depth dose effect. Two points had to be borne in mind in using the short distance X ray tube. First, the depth dose was small and for this reason he felt that it should be used with discretion in the treatment of tonsillar lesions, and secondly, the energy distribution is such that it falls off rapidly towards the edge of the field. This fact must be borne in mind in treating skin malignancy and a correspondingly wider area be subjected to radiation. Short distance X ray therapy had taught us two important lessons. The first of these was that permissible dosage is closely associated with the size of the field irradiated, and with small fields it was possible to administer doses measured in *r* similar to those given by radium. The second point was that dosage is also related to volume of tissue irradiated, and here we find that as a result of the superficial distribution of energy in the tissues it is possible to deliver higher doses with the short distance X ray tube than with an X ray tube generating rays of much shorter wave-length but operating at a greater distance and so irradiating a larger volume of tissue despite the fact that the ports of entry may be similar in size.

Ventriculography

Dr. ERIK LYSHOLM of Stockholm gave an address before a large audience on radiological experience in ventriculography, based upon 806 verified cases examined by ventriculography and encephalography. The use of the method was, he said, increasing. In Stockholm air was now solely employed as the contrast agent; with refined technique, it would show all the details which could be elicited by opaque media, the use of which had proved inseparable from risk. Arteriography was only employed when a vascular lesion was suspected. For radiography he used an apparatus whose constant focal-distance at all angles enabled him to make a three-dimensional reconstruction of the ventricular system. When the reconstruction was superimposed upon an anatomical chart, slight deformities were readily appreciated, and the lesions could be accurately localised. He demonstrated his new type of grid, constructed entirely of metal, which absorbed its own secondary and tertiary radiation. The grid lines were so fine as to be almost invisible, and the thickness could be adapted to varying conditions and objects. The ventriculographic appearance of supra-tentorial tumours he divided into three groups, each with its characteristic picture:—

(1) *Convexity tumour*, causing lateral displacement, with tilting of the upper end of the septum pellucidum away from the tumour and flattening of the upper angle of the lateral ventricle of the same side. The higher the tumour, the greater the amount of tilting of the septum.

(2) *Tumour situated laterally*, at the level of the Sylvian fissure, causing lateral displacement without tilting of the septum or indentation of the outer angle.

(3) *Temporal tumours:* the typical picture was a lateral displacement with a characteristic angulation of the septum and third ventricle to one another. This angle was open towards the side of the tumour; the lateral ventricle on this side was narrowed, drawn out into a point inferiorly, and showed an indentation on its lower outer side. In this group it was essential to observe the temporal horn. The direction in which it was displaced would determine whether the tumour was superficial or deep.

Filling of the third ventricle, of the aqueduct, and of the fourth ventricle was accomplished by special techniques. Characteristic filling defects were then observed with intrinsic and extrinsic tumours of the third ventricle. It was sometimes possible to determine the operability of intraventricular tumours by observing whether they were completely surrounded by air or attached to the ventricular wall. He demonstrated examples of very small cysts at the foramen of Monro—an important type, of which he had seen four cases—tumours of the anterior middle and posterior parts of the third ventricle, and pineal tumours. Posterior third ventricle tumours could not always be distinguished from one another. The pinealoma gave a well-defined filling defect with more or less complete filling of the suprapineal recess. Calcification in the tumour did not necessarily signify that it was a pinealoma. Four such tumours had proved to be gliomata, and one a tuberculoma. Tumours of the lamina quadrigemina were often hard to distinguish from posterior tumours of the third ventricle; in some cases both regions were invaded. If the ventricular defect were small in comparison with the degree of displacement of the aqueduct, the tumour was likely to be quadrigeminal. Careful observation of the aqueduct gave valuable indications. Quadrigeminal tumours displaced it towards the clivus, but not laterally. Upper vermis tumours caused early compression of the aqueduct, and in the lateral view have a typical picture—namely, an angulation of the supratentorial part of the aqueduct, the peak of which was directed backwards, together with a bowing of its infratentorial part and of the fourth ventricle downwards and forwards, unaccompanied by any lateral displacement. This deformity did not occur with inflammatory stenosis. Tumours of the cerebellar hemispheres caused bowing of the aqueduct towards the base, with lateral displacement. They rarely obliterated

the cavity of the fourth ventricle. Tumours of the lower vermis pressed upon the lower part of the fourth ventricle which, together with the aqueduct, was dilated. Angulation of the aqueduct was rarely seen. Intraventricular tumours, if large, might completely obliterate the cavity of the fourth ventricle. If small, they could be outlined: a rough or irregular outline indicated a papilloma. Ependymomata and medulloblastomata showed smooth surfaces.

Cerebellopontine angle tumours displaced the aqueduct dorsally and towards the opposite side, and often caused a depression of the lateral wall of the fourth ventricle. Pontine tumours also displaced the aqueduct dorsally, but lateral displacement did not occur. Dorsal displacement of the aqueduct with flattening of the floor of the fourth ventricle had been observed in a few cases of meningioma of the clivus.

Dr. E. W. TWINING, proposing a vote of thanks, stressed the personal element in Dr. Lysholm's investigations. The brilliant results which he had demonstrated resulted from the concentration of the cases in one centre, and from the concentration of the best brains upon that material. Routine radiography could not obtain equivalent results. Every case involved careful and prolonged personal study.

Short Papers

Dr. H. W. A. POST outlined the technique and normal and pathological salpingographic appearances in the uterus and tubes.

Dr. E. ROHAN WILLIAMS indicated the value of urography, ascending and intravenous, in demonstrating the physiological dilatation of the renal pelves and ureters in pregnancy, and the cystographic diagnosis of placenta prævia.

The use of lipiodol in the localisation of spinal tumours was described by Dr. H. M. WORTH, who gave details of the technique and showed a number of cases diagnosed by lipiodol introduced by the lumbar and cistern puncture respectively.

Dr. M. H. JUPE read a paper on cases of suprarenal tumour, and described the clinical and radiological appearances in the Pepper and the Hutchison types of neuroblastoma of the adrenal medulla. He drew attention to certain characteristic bone changes in the latter type.

PUBLIC HEALTH

Refresher Courses

THE life of a medical officer in any branch of the public health service is increasingly hard. The enlarging scope of the public health department is calling for a very high type of medical officer who requires, in addition to medical knowledge, personal and social qualities to which Sir Kingsley Wood alluded at the last annual dinner of the Society of M.O.H.'s. The imagination of the advertising agent, the zeal of the missionary, the patience of Job, the hide of the hippopotamus were among the qualifications, "coupled," he added, "I suppose, with medical knowledge." On the same occasion Dr. Ernest Ward spoke of the initiative taken by the Society in promoting higher education, and its hope for the advice and coöperation of the Ministry of Health in arranging for it. The organisation of short post-graduate courses for the various classes of medical officers employed by local authorities was the first step suggested. No time has been lost and a circular now issued by the executive secretary of the Society to local authorities tells of provisional arrangements for a series of refresher courses. Three such courses are announced:

(1) Sept. 28th to Oct. 1st, at Cardiff, for medical officers of health, limited to 40.

(2) Week beginning Nov. 8th, at Manchester, for school medical officers, limited to 30.

(3) Early in 1938, a course in infectious diseases, in London, limited to 20.

No sanction, it seems, is required for expenditure incurred on these courses by local authorities which have the conviction that they will get an adequate return for their money in the maintenance of efficiency on the part of their staff. The Board of Education has also expressed general agreement with the principle and a syllabus of a school medical course is now being drawn up. An attendance fee of two guineas will cover the central organising expenses and local fees for each course, and prompt application is desirable in view of the strict limitation of numbers. No other commendation of the scheme is necessary than a mild expression of surprise that it has not been put into execution before. All honour to the present initiative.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 5TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet-fever, 1517; diphtheria, 925; enteric fever, 39; pneumonia (primary or influenzal), 652; puerperal fever, 33; puerperal pyrexia, 124; cerebro-spinal fever, 17; acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 5; relapsing fever, 2 (Leatherhead, Wharfedale R.D.); continued fever, 1 (Stockport); dysentery, 33; ophthalmia neonatorum, 115. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 11th was 2902, which included: Scarlet fever, 736; diphtheria, 830; measles, 91; whooping-cough, 446; puerperal fever, 22 mothers (plus 13 babies); encephalitis lethargica, 282; poliomyelitis, 2. At St. Margaret's Hospital there were 24 babies (plus 13 mothers) with ophthalmia neonatorum.

Deaths.—In 123 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 7 (0) from measles, 0 (0) from scarlet fever, 16 (6) from whooping-cough, 29 (4) from diphtheria, 46 (13) from diarrhœa and enteritis under two years, and 17 (4) from influenza. The figures in parentheses are those for London itself.

Four persons died at Birmingham of diphtheria and 2 each at Darlington and Worcester. There were 7 fatal cases of diarrhœa at Willesden and 4 at Leeds.

The number of stillbirths notified during the week was 313 (corresponding to a rate of 41 per 1000 total births), including 52 in London.

NEW HOSPITAL AT IVER.—The new Iver, Denham, and Langley Cottage Hospital will be opened on July 2nd by the Duke of Kent.

ROYAL EYE HOSPITAL, SOUTHWARK.—This hospital is setting up a special committee to carry out research with a view to preventing injuries to the eyes. A museum of various devices intended to protect the eyes of industrial workers is being prepared and the committee is asking employers in South London to help in the campaign. Plans are being prepared for two additional wards and accommodation for extra nursing staff is to be provided. The cost of this, which is the first part of the rebuilding scheme, will be about £50,000.

PARLIAMENTARY INTELLIGENCE

THE HEALTH SERVICES

WE have already summarised (p. 1439) some part of Sir Kingsley Wood's important statement on committee of supply on the health services. A few of his chief points remain to be noted. Advances, he said, had been made in the treatment of child-bed fever; the discovery that certain organic chemical compounds could reduce both the mortality from this disease and the incidence of complications had been of outstanding importance. The epidemic of enteric fever during the year at Bournemouth, Poole, and Christchurch illustrated once again the difficulty of ensuring a safe milk-supply otherwise than by pasteurisation, where the milk was as in this case obtained from many sources and pooled before distribution. There had also been an increase in the proportion of mortality caused by some of the diseases whose prevalence was greatest among the older part of the population; that was, he supposed, a natural corollary of the decline in the great killing infectious diseases which used to take a heavy toll at all ages. The fixing of the date from which the new overcrowding provisions were to operate in particular areas was proceeding steadily; up to the end of March 1484 orders had been issued for fixing the appointed day, leaving 52 to be fixed before the end of the year. The same date marked the end of the fourth year of the five-year programme of slum clearance. It had more than kept its promise. Four-fifths of that programme was represented by 166,000 houses and already the houses in submitted orders and purchase agreements exceeded that number. In April last he asked the maternity and child welfare authorities to review their arrangements for the supply of milk and meals to nursing and expectant mothers and young children; replies from such places as Durham and Leyton had stated that their services were already complete; 33 authorities had reported that they were taking further action. During the past year he had urged on local authorities the importance of the fullest supervision over the health of children between the ages of 18 months and five years; at least 47 authorities had established special clinics for toddlers, and 53 had arranged for the school medical services to be available for the younger children, while 64 had appointed additional health visitors. He had been struck with the fact that although we had perhaps the finest social services in the world, they were by no means fully utilised; he hoped in the autumn of this year, in connexion with the Board of Education and the Central Council for Health Education, to organise a national campaign to bring these health services more to the notice of the people. The keynote of the campaign would be: "Use your health services." They would get a real advance, apart from the creation of new services, in getting the people to utilise the services already in existence. The establishment of the Ministry of Health was the outward expression of Parliament that national health was of supreme and vital importance to the State, and it was undoubtedly inspired by that new and wider humanity which was so prevalent to-day. Their aim must continue to be along those lines and it should be their desire to the best of their endeavour and capacity to make good health the birthright of every citizen. Certainly this could be said, that the fight for good health could not be successfully conducted with a limited choice of weapons or on a narrow front. We must more than ever use the whole armoury which modern knowledge and medical science had given us, and, if possible, broaden our front and deal not only with the specific diseases of the individual but more and more with the wider conditions, the environment, the occupations, and the conditions of our people. Although there was much to accomplish it could be claimed that their efforts to build up a healthy nation had not been in vain.

CRITICISMS OF GOVERNMENT POLICY

Mr. AMMON said that the block grant system limited the full play of the health services. He hoped that before it was too late the Minister would turn his mind to the planning of satellite towns and the location of industry; otherwise, when they had got over the immediate needs, they would be faced with greater social problems and difficulties than in the past. The provision of public abattoirs was urgent.

Mr. HAMILTON KERR said there was still little supervision of the child between the ages of two and five years. A definite health policy should ensure the regular medical supervision of every child up to the age of 16. In every local centre a properly organised file of the entire health history of each boy and girl should be readily available.

Mr. LANSBURY contended that the necessity for a range of services which the Minister of Health controlled through local authority arose largely because of poverty, and until poverty was dealt with we should not make true progress. Until children could get within their homes all the food necessary for them, we should not obtain that healthy, virile youth population that we all wanted to see.

Sir FRANCIS FREMANTLE dealt with the proposed additional ophthalmic benefits. There was, he said, a contest between the ophthalmic surgeon on the one hand and certain persons in the benefit societies on the other, as to what was the proper way of administering ophthalmic benefit. Obviously it was the most convenient thing to allow opticians to prescribe spectacles. But the departmental committee of 1922 had stated that "... an official register of opticians would tend to mislead the public into thinking that registered opticians were competent to discharge functions which belong only to those who have had a medical training." And the committee of 1927 said: "We are not satisfied that even those opticians who are most highly qualified in all other respects are sufficiently trained in this respect." Since 1927 the Association of Dispensing Opticians and the National Ophthalmic Treatment Board had been set up, with inclusive charges well within the means of those whose family income did not exceed £250 per annum. That being so it was dangerous to allow additional benefit to be given by persons not qualified to find out the trouble at the back of the eye.

The case for satellite cities was agreed, but the difficulty was to get them put into effect by local authorities. It was not simply the establishment of a garden city here or there that was needed, but the adaptation of the whole town-planning movement in that direction. Meanwhile London was sprawling over the countryside. Some authority ought to take hold at once of the centres that were being made by the arterial roads. They would be the centres of the future communities, and yet they were allowed to be taken up by petrol stations, breweries, public houses, and caravans. He hoped the Greater London planning authority would be revived.

Sir FRANCIS went on to endorse a plea made by Mrs. Tate for a trial of the Scandinavian experiment in the treatment of venereal disease which had resulted in almost complete immunity from syphilis and a large reduction of other diseases. Here the position had been improved by the scheme of treatment centres, but a large number of persons failed to pursue the treatment to the finish. Of the nearly 50,000 persons who last year attended V.D. clinics, only 22,000 had the final tests of cure, and nearly 20,000 ceased to attend before completion of their treatment. The first essential was education and the Ministry of Health ought to exercise pressure on the local authorities to keep up their quota of subscriptions to the Social Hygiene Council. They also had to consider seriously whether it was not

desirable to introduce some kind of compulsion either in notification or in ensuring completion of treatment. In Holland a voluntary system had given results better than ours; last year they had only 11 fresh infections per 100,000 of the population.

Mr. J. HENDERSON said that rheumatism was startlingly prevalent in large portions of industrial England. Several continental governments, backed up by the municipalities, had established a network of spas and clinics. In this country the leading hospitals were not dealing as they should with the manipulative treatment of this disease. He urged the Minister to organise a national service of municipal clinics in conjunction with the local hospitals.

Mr. G. GRIFFITHS urged the Minister to deal with burning pit heaps in mining districts, the fumes of which caused ill health. He commented on the absence in the report of anything about diabetes. We had in this country not fewer than 200,000 diabetics. A State-insured person who was a diabetic got his insulin free; if the wife of such a person was a diabetic and was prescribed insulin, her husband had to pay anything from 10*s.* to 18*s.* a week for it.

Mr. GODFREY NICHOLSON said that the Ministry were losing a sense of proportion with regard to maternal mortality. Too much stress was being put on antenatal treatment and not enough emphasis on the importance of skilled attention at the actual time of birth. An eminent gynæcologist had said to him that it was the specialist who should be looking after the actual confinement and the practitioner doing the antenatal care. The solution of the problems of maternal and infantile mortality lay in educating the whole population.

Miss WARD said that before embarking upon a campaign of "Use your health services" it was important to know whether there were adequate health services provided by every local authority. We should have a detailed survey of what health services were available to see whether local authorities were taking advantage of the powers which they could use, and whether they had the necessary finances to enable them to do so.

MINISTERIAL REPLY

Mr. BERNAYS said that the figures in the latest annual report of the chief medical officer of the Board of Education were illuminating. They showed that out of 1,680,000 school-children examined, only 0·7 per cent. were suffering from definitely bad nutrition and only 10·6 per cent. from subnormal nutrition. There was also the encouraging fact—which gave the lie to the assertion about the deterioration of our national physique—that the general death-rate had fallen by one-third during the last 25 years and that the death-rate from tuberculosis in children under one year of age had been reduced by a half in the same period. Malnutrition was a problem and the Government could legitimately claim that it had been tackled with energy and effect in the last few years. Reference had been made to the question of satellite towns. This question was dealt with by a departmental committee in 1924, which recommended the establishment of a National Planning Board. The main suggestion was that the larger local authorities should be encouraged, and, if necessary, compelled, to make further outward development in the form of planned units outside the town, separated by adequate areas of open land. The instances of Welwyn and Letchworth garden cities had been raised, and the Government had been asked why we cannot apply experiments of that kind. These garden cities were started by public utility companies, and local authorities were doing much to secure the same objects. After all, town planning was planning to secure proper sanitary conditions, amenities, and conveniences. The increasing use of joint committees meant the extension of planning for larger units.

[Sir FRANCIS FREMANTLE: They are doing nothing to marry factories to residences, and that is the whole essence of the thing.]

Houses were being built, Mr. Bernays rejoined, under healthy conditions on the outskirts of the towns, and this policy would be continued and encouraged. With the existing organisations, and working with the sympathy of established authorities, much was being and could be done.

Objection had been taken to the recognition of opticians as having power to prescribe for defective eyesight. While the Minister was satisfied that the ultimate ideal was that all persons should go to a medical eye specialist, he was satisfied that it would not be practical politics under present conditions to make this an invariable practice in all cases. The reasons were that the supply of qualified medical men was not sufficient to meet the needs of the whole population and that the people had not been educated up to recognising the advisability of this course in what they regarded as ordinary, straightforward cases of defective eyesight. The regulations, therefore, provided for either of the alternative courses being followed. Every insured person was required to visit his own insurance doctor before his application for ophthalmic treatment was granted.

PENSIONS FOR LOCAL GOVERNMENT OFFICERS

In the House of Commons on June 11th the Local Government (Superannuation) Bill was read a second time. In moving the second reading Sir KINGSLEY WOOD said that the main and general object of the Bill was to secure such a measure of uniformity as might reasonably be required in regard to the provisions to be made by local authorities for pensions for their staffs. It required provision to be made for the superannuation of all whole-time local government officers and facilitated similar provisions by local authorities over and above that made by the general law relating to pensions for their other employees. The Bill brought the local government service in this respect into line with the long-established practice of the Civil Service and thus added another measure of protection in old age to a further section of the community. The present rate of contribution for both officers and servants was 5 per cent. of their remuneration with an equivalent contribution from the local authority. It was estimated that in the present circumstances the rate of contribution needed to secure the benefits was in total 12 per cent. for officers and 10 per cent. as at present for servants, and the Bill accordingly proposed to increase the rate for new entrant officers by 1 per cent. with a similar increase in the authorities' contribution. The Bill contemplated the minimum of interference with the various superannuation schemes established under local Acts, but if the main purpose was to be achieved it was essential that those schemes should be extended to cover, when they did not already do so, all whole-time officers.

DIFFERENTIAL TREATMENT

Captain ELLISTON expressed disappointment that no provision was made by the Bill for the optional grant of added years by local authorities in the case of their professional officers. He had been advocating that concession since 1922. He had some special experience of the conditions of service of medical officers. They were men who spent five or six years in acquiring their professional qualifications. At the end of that period if they were wise, or if they were fortunate, they took a period of service as house physician or surgeon in a hospital and then they had to acquire the further professional qualifications which would enable them to take a public health appointment. In view of the tremendously varied character and importance of public health work in these days, a medical officer who hoped to secure an appointment had to acquire special experience in a number of directions. He had to spend a period of residence in hospital; he had in most cases to spend a period in a tuberculosis sanatorium. He

had to acquire extra experience, perhaps, in diseases of women and children, and so on. That meant that he was usually 30 years of age, or more, before he could obtain his first appointment. Owing to this late entry at a higher salary level the contributions of these officers in relation to their pensions were much higher than those of non-professional officers, many of whom entered the local government service as soon as they left school. He (Captain Elliston) was hopeful that it was not too late for the Minister to consider whether he could make some concession in this matter and give local authorities the power, if they so desired, to add years, not exceeding ten, to the number which professional officers, in such circumstances as he had described, had actually served. Alternatively, it was being suggested that years spent in professional training should be allowed to count as service years within the meaning of the Act. He knew the anxiety of the Minister to promote coöperation between the municipal hospitals and the great voluntary hospitals. He (Captain Elliston) was told that there were members of the House of Commons who would like to see it made possible by this Bill to provide for the interchangeability between the federated superannuation scheme of the voluntary hospitals and the superannuation scheme of the local authorities. If that were practicable it would undoubtedly facilitate the interchange of personnel and would do a great deal to raise the standard of the hospital services in this country. What he had said also applied to other officers such as health visitors, nurses, and so on.

Mr. W. H. GREEN said the London County Council had 3400 nurses on probationary service and he gathered that under this Bill those nurses would immediately be placed under the superannuation scheme. There was a great amount of coming and going in the ranks of probationers, particularly in the nursing profession, and a hardship would be imposed if all the probationery nurses to whom he had referred were compelled immediately to be placed under the superannuation scheme. Another point affected the health visitors engaged by local authorities. He was delighted to think that at long last the retiring age of health visitors was to be fixed at 60; but that carried with it a great grievance, because to qualify for the maximum pension health visitors must have put in 40 years' service. That would be well-nigh impossible under the conditions of the Bill. It was very seldom that a health visitor was appointed under the age of 25. That meant that at the most they could put in only 35 years' service. He wondered whether some compensation might be provided in the Bill in regard to the 5 years' service.

Sir FRANCIS FREMANTLE said among civil servants they had men of the highest possible attainments. Those interested in local government wanted to get the same type of men into the local government service. To attract them to this service they must remove certain disadvantages, one of which had been the absence of superannuation provision. This Bill helped to meet that difficulty. There were points in the Bill in which the transition from voluntary service to public service might be made more easy. The arrangements under the present Bill were not satisfactory for bringing in the midwives, who while working under voluntary associations in villages where they were not employed for the whole of their time were also under a contract with the local authority under the Midwives Act to provide a midwifery service. Sir Francis asked the Minister to give the most earnest consideration to the requirements which would enable the midwives to secure the full advantages of superannuation. It was difficult to recruit midwives, yet it was on the midwifery service that they depended very largely for the improvement of the maternity services of the country. He gave his cordial support to this Bill as a constructive measure for building up a great local government service.

MINISTERIAL REPLY

Mr. BERNAYS, Parliamentary Secretary to the Minister of Health, said that the clause which dealt with the position of nurses was based on the recommendation of the Selby-Bigge Committee. Obviously this was a matter which could very well be considered when the Bill reached committee. The Minister would be glad to receive any representations on the part of the interests concerned between now and the committee stage. As to the point raised by Captain Elliston as to why there was a differentiation in the rates of contribution between officers and servants, a uniform rate of 5 per cent. was fixed by the Act of 1922 for all employees brought within its provisions. It was urged before the Selby-Bigge Committee that the remuneration of an officer usually increased automatically or by promotion from the beginning to the end of his service, and he was pensioned on the average remuneration of the last five years of his service when his remuneration was obviously at the highest. On the other hand, a workman received wages which soon reached their maximum and remained at the same level for many years. Accordingly, a workman's contribution paid throughout on a flat basis of remuneration brought into the superannuation fund a greater sum in relation to the pension drawn than did that of an officer. Since the same scale of pension was applicable to both classes of employees a smaller percentage rate of contribution should be sufficient in the case of a workman than in the case of an officer.

THE SCOTTISH MEASURE

On the previous day Mr. ELLIOT, Secretary for Scotland, moved the second reading of the Local Government Superannuation (Scotland) Bill. He explained that there were two specific points in which the Bill differed from the English measure. In the first place it was proposed that the minimum number of officers to be covered by the scheme should be 50; under the English Bill the minimum number was 100. In the second place, in the Scottish Bill they also made provision for local authorities to act jointly in cases where they had not themselves a sufficient number of employees to make a separate scheme. But all the "small burghs" had fewer than 50 whole-time officers, so for this purpose they would be counted as employees of the county councils.

NOTES ON CURRENT TOPICS

Physical Training

In the House of Commons on June 11th the Physical Training and Recreation Bill was read a third time. On the motion for the third reading, Mr. LINDSAY, Parliamentary Secretary to the Board of Education, said that since the second reading action had been taken on four points. The local organisations committee had done a great deal of preliminary work and he hoped the local bodies would begin work during the summer holidays. The committee on propaganda intended to start an intensive campaign in the autumn. It had given special consideration to the use of films. The technical committee had been considering the question of the National College and had proceeded a long way. The question of research was very important. The grants committee could begin to consider applications as soon as the statutory powers were obtained. The aim was to build up a new leadership of trained men and women and to inspire the whole nation with the great ideal of personal fitness. They could not rest content until every child in the country had equality of access to all that was meant by physical education and had an equal chance to become a healthy citizen.

Mr. LEES-SMITH said he had come to the conclusion that the part of the Bill which ultimately would probably prove the most valuable would be that which dealt with physical education, particularly in the form of remedial exercises for those whose work was deleterious to their health, rather than that

which dealt with physical recreation. It must not be taken for granted that because young medical men engaged in active physical recreation up to the age of 25 or so they did not need physical education. One of the most striking observations which had fallen from Lord Dawson of Penn was that when he had watched hikers, tennis players, and even territorials, he had noted that many of them were suffering from defects of posture, stooping shoulders, and bad chests, which would pay them out a little later when the health and strength of youth had passed. He (Mr. Lees-Smith) had never envied great athletes from the point of view of permanent fitness for life. When he read of the death of great athletes and noted their age he came to the conclusion that they were not quite as well off as the rest of the population and he was reminded of an observation by Plato that "an athlete is on a slippery edge in respect of health." He hoped it would not be thought, therefore, that by providing facilities for great athletic prowess they would be doing the work of building up the physical health of the nation.

Mr. WAKEFIELD said speaking for himself, and he was sure also for his colleagues on the National Advisory Council, their aim was to try to make the great mass of the people, young and old, physically fit. They did not want to get a few sprinters doing 100 yards in 10 seconds; they would far rather have a million people doing 100 yards in 12 or 13 seconds. The result of their work would not depend on the success and ability of one or two outstanding athletes but on the general excellence attained by all.

Mr. LINDSAY, replying to the debate, said that while they all wished to encourage the games which were characteristic of this country there was a great deal to be said for physical education as such. He was told by experts that at the present time they were all going about half dead, and that there were a few very simple exercises which every member of the House of Commons could take every day and which would make a great difference to the health, the physique, and the happiness of those who engaged in them. They did not quarrel with that theory at all. He had the greatest admiration for what was being done in Germany, Czechoslovakia, Sweden, Denmark, and elsewhere, but he was still convinced that they had to proceed on the basis of our characteristic British games. If they did that he was quite certain they would make this organisation a complete success.

School Medicine

On June 14th in committee of supply, Mr. KENNETH LINDSAY, Parliamentary Secretary to the Board of Education, said that the total increase in the vote over last year was for £1,296,233. Part of the increase was due to general maintenance charges, and there was another item, provision for physical training under the Government's new scheme. That provision would be made in a supplementary estimate. During the last 18 months provision had been made for the youngest children by way of 7500 nursery schools in 80 different areas. Fifty new schools with playing fields attached were approved in 1935–36, and during the last year 90 such new schools were also approved. During the last two years, 111 playing fields had been acquired for separate schools, and 61 to cater for a variety of schools had been acquired. Gymnasia had been provided for 117 elementary schools. Mr. Lindsay was glad to be able to report progress along many lines of advance in regard to the School medical service and physical education. Since the recent circular was issued 34 new proposals and 5 proposals for enlarging existing nursery schools had been received. The present position was that 89 nursery schools were recognised by the Board of Education, and in addition 31 had been approved in principle and 10 were under consideration. While the growth was rapid in proportion the total was still comparatively small and there were still many areas where local conditions would justify providing these schools but where proposals had not been received. Their object was to obtain for all children under five years of age whose home conditions were unsatisfactory light airy rooms, special playgrounds, play material, and a happy environment which they needed for normal physical and mental development.

MORE STAFF NEEDED

The school medical service was a wonderful service, but it needed more staff. Since the recent circular was issued 32 authorities had increased their staff by the appointment of six whole-time and 29 part-time medical officers; 12 authorities had appointed aural and 8 ophthalmic specialists, and one a specialist on rheumatism. One hundred proposals had been received for building school clinics and extending old ones and there were 13 new schemes for orthopædics, 19 for aural treatment, and 15 for artificial light treatment. These were examples of how the staff was being increased, but there was still leeway to make up. At the time of the issue of the circular it was estimated that there were less than two-thirds of the number of school dentists required. He was glad to say, however, that 61 authorities had increased their staff by employing 62 full-time and 23 part time dentists. But the ideal they must achieve was an annual inspection of all school-children; otherwise he did not see how they could make good progress in this which was probably one of the most important aspects of the health services. There were also day open-air schools, residential schools for delicate children, and the problem of the feeble-minded was always with them. It was particularly difficult to deal with in the countryside. For some children the only solution was the residential school and on that score one new proposal had been received from a country district.

On June 11th in the House of Commons the Children and Young Persons Bill, which has already passed through the House of Lords, was read a second time.

QUESTION TIME

WEDNESDAY, JUNE 9TH

Milk Ration for Boys in the Navy

Mr. GRAHAM WHITE asked the First Lord of the Admiralty the present amount of the milk ration for boys in the Navy.—Mr. DUFF COOPER replied: There is no fixed ration of milk for boys in the Navy as they are victualled under the general mess system and are provided with a varied dietary without fixed rations of the various items of foodstuffs. The average amount of milk issued daily to each boy is estimated to be approximately ½ pint.

Colonel GRATTON: Will my right hon. friend say whether the milk is fresh or tinned?—No further answer was given.

Industrial Employment of Children at Home

Mr. DENMAN asked the Home Secretary whether his attention had been called to the charges made of excessive employment of children at home on industrial work; whether he could give any information as to the extent of this practice; and what steps he was taking to stop it.—Mr. GEOFFREY LLOYD, Under Secretary, Home Office, replied: I am obliged to my hon. friend for calling attention to this matter, about which no complaints have reached the Home Office. In 1931 as the result of an inquiry it was reported by the education authorities that 652 boys and girls aged 12–14 were employed in industrial work at home within the limits allowed by the law. My right hon. friend is proposing to ask the education authorities in the near future for information as to the application of the law as amended by the Children and Young Persons Act, 1933, and this information will include the point now raised.

Royal Marines and Tuberculosis

Mr. ROBERT TAYLOR asked the First Lord of the Admiralty the number of Royal Marines invalided out of the service owing to tuberculosis; the number who

had applied for pension; and the number of cases in which pensions were awarded during the last three years.—Mr. DUFF COOPER replied: During the period of three years ended April 30th, 1937, 65 Royal Marines were invalided out of the service on account of tuberculosis, of which number 62 were pulmonary and 3 other forms; each invalid was automatically considered for an award of pension which was granted in 43 cases.

THURSDAY, JUNE 10TH

Health of Spanish Refugee Children

Mr. LEACH asked the Minister of Health whether the Basque children who recently reached this country had been vaccinated and inoculated before their arrival, and, if so, against what diseases were they vaccinated or inoculated; and when were these operations performed.—Sir KINGSLEY WOOD replied: So far as I am aware no special measures of vaccination or inoculation were taken before the children's arrival in this country, but approximately 50 per cent. were found on examination to have been vaccinated against small-pox. I understand that a first inoculation against typhoid has now been given to nearly all the children in the camp at North Stoneham.

Sir ARCHIBALD SOUTHBY asked the Minister of Health how many Spanish refugee children had been admitted into this country; and how many cases of typhoid or suspected typhoid had occurred amongst them.—Sir KINGSLEY WOOD replied: According to the information with which I have been supplied, 3881 children arrived at the camp at North Stoneham on May 23rd and 24th. Six cases of typhoid, including one not finally diagnosed, and one of paratyphoid have occurred amongst them. Three children are at present under observation for this disease.

Sir A. SOUTHBY: In view of the risk of the spread of this disease would the right hon. gentleman give an assurance that none of these children will be allowed to move to other parts of the country until they have undergone the full quarantine?—Miss WILKINSON: Is it not a fact that the arrangements in regard to quarantine have been most admirably carried out by the voluntary service of doctors?

Sir KINGSLEY WOOD: The responsibility for the conduct of this matter rests with the voluntary committee. I think that everyone will agree that my department have given all the advice and assistance that can be given in this matter, and we shall continue to do so. So far as the question of the removal of children is concerned, I am anxious myself, subject to satisfactory medical conditions, that these children shall leave the camp as soon as reasonably practicable and possible. Any assistance that my medical officers can give to medical officers in districts where they may have to go, in order to secure safety so far as health is concerned, will be given.

Sir J. LAMB: Will the medical officers of health be informed before the arrangements are made to transfer these children?

Sir KINGSLEY WOOD: Oh yes, Sir. It is obviously a very important responsibility on the local medical officers of health.

Sir JOHN HASLAM: Does the right hon. gentleman realise that some of these children have already been removed from the camp and that some of them are in my own constituency? Have the necessary steps been taken between the Ministry of Health and the local authorities to make sure that the children are fit to be removed?

Sir KINGSLEY WOOD: The matter is one for the local authority in the area and the medical officer concerned. From my own knowledge and observation I believe that the medical officers in the districts are fully alive to the need for properly carrying out their duties.

Juveniles and National Health Insurance

Mr. THORNE asked the Minister of Health whether the court of inquiry had come to any settlement in connexion with the fees to be charged by the doctors when boys and girls become employed after leaving school; and whether the Government intended bringing in a Bill to deal with the matter.—Sir KINGSLEY WOOD replied: Yes, Sir. The court of inquiry which was asked to consider the doctors' capitation fee to be paid as from January next for all insured persons entitled to medical benefit, on the assumption that employed juveniles would then be included, has reported in favour of the present rate of 9*s*. per annum. I shall introduce the necessary Bill as soon as Parliamentary business permits.—Mr. THORNE: Is it in consequence of their powerful organisation that the doctors have got all that they wanted?—Sir KINGSLEY WOOD: I would advise the hon. gentleman to consult the doctors.

Health Insurance and Ophthalmic Treatment

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health whether the National Ophthalmic Treatment Board was taken into consultation by him in drafting the Additional Benefits Amendment, 1937; and whether he was satisfied that the arrangements made by these regulations for permitting sight testing by recognised opticians would in no way interfere with the development of the best possible ophthalmic medical service in this country.—Sir KINGSLEY WOOD replied: Before the regulations to which the hon. Member refers were made the fullest consideration was given to the views expressed on behalf of doctors associated with the work of the National Ophthalmic Treatment Board. I see no reason why any arrangements made under the regulations should interfere with the development of a satisfactory ophthalmic medical service.

Major PROCTOR asked the Minister of Health whether, in connexion with the Additional Benefits Amendment Regulations, 1937, he could say what steps had been taken by him to obtain agreement between the sight-testing opticians and the National Ophthalmic Treatment Board with regard to the question of sight testing in connexion with ophthalmic benefit.—Sir KINGSLEY WOOD replied: Repeated attempts have been made to obtain agreement between the different schools of thought on the subject referred to by my hon. and gallant friend and I have myself received representative deputations from both sides. Unfortunately it was not possible for any agreement to be arrived at.

Unemployed Persons and Dental Treatment

Mr. WHITELEY asked the Minister of Health whether his attention had been drawn to the increased cost of public assistance committees due to dental treatment and the provision of artificial dentures to persons in receipt of allowances from the Unemployment Assistance Board; and whether he was prepared to arrange for such cost to be met by the Board and thus relieve the local public assistance committees of what should be a national charge.—Sir KINGSLEY WOOD replied: I have received a communication from one local authority on this matter. I am advised that under the Unemployment Assistance Act the Board have no power to defray the cost of dental treatment.—Mr. WHITELEY: Do I understand that the public assistance committees will still have to bear the burden of these additional costs?—Sir KINGSLEY WOOD: Yes, Sir; the provision of medical benefits remains the responsibility of the local authorities under the Act.

MONDAY JUNE 14TH

Spanish Refugee Children

Mr. MITCHELL asked the Home Secretary whether he could make any statement in regard to the future of the Spanish refugee children in Great Britain in the event of it being impossible to repatriate them in the near future.—Mr. LLOYD, Under-Secretary, Home Office, replied: The committee responsible for the care and maintenance of these children has given an undertaking to the Government that they will be repatriated by the committee as soon as circumstances permit. It is clearly impossible to foretell when circumstances will permit of repatriation. As my right hon. friend the Minister of Health stated on June 10th, the responsibility for any arrangements for moving them from the camp at North Stoneham rests with the voluntary committee, which is, I understand, making arrangements for their accommodation in groups in private institutions and similar places.

Effect of Noise on Health

Sir RALPH GLYN asked the Minister of Health whether he would appoint a committee to inquire into the detrimental effect of unnecessary noise on the health of people

living in large cities; and how far medical opinion supported the view that many instances of nervous breakdowns, &c., were due to causes which could be to a great extent eliminated.—Sir KINGSLEY WOOD replied: Research into the effects of noise on workers carried out by the Industrial Health Research Board of the Medical Research Council, on which reports have been published, shows that it is very difficult to detect and measure any specific effects of noise on health, and it is hardly possible to assess within the limits of a Parliamentary answer the influence which medical opinion would assign to the part played by noise in the increased strain of modern life. I will send my hon. and gallant friend some references to medical publications on this subject. As at present advised, I do not think the subject lends itself to investigation by a committee as suggested.

TUESDAY, JUNE 15TH

Nurses' Hours in Scottish Mental Hospitals

Mr. ROBERT GIBSON asked the Secretary of State for Scotland what was the total number of attendants and nurses on the staffs of, or employed at, mental institutions in Scotland as at May 31st, 1937; how many of these individuals had a tour of duty extending to 84 or more hours, 78 and under 84 hours, 72 and under 78 hours, 66 and under 72 hours, 60 and under 66 hours, 54 and under 60 hours, 48 and under 54 hours, 42 and under 48 hours, and under 42 hours per week, respectively; what were the corresponding figures for the Smithston institution in Greenock; and if he had any statement to make regarding the introduction of legislation to restrict the working week of such individuals to a maximum of 48 hours.—Mr. WEDDERBURN, Under-Secretary of State for Scotland, replied: The information desired is not immediately available but steps have been taken to obtain it and I will communicate with the hon. and learned Member when it is received.

Maternal Mortality

Mr. JAMES GRIFFITHS asked the Minister of Health the maternal mortality-rate for each of the administrative counties and county boroughs in Wales for the year 1936, and the corresponding rate for England and Wales as a whole.—Sir KINGSLEY WOOD replied: The following table gives the information requested by the hon. Member:—

	Maternal mortality deaths for 1936 per 1000 total (live and still) births.	
	Puerperal sepsis.	Other puerperal causes.
England and Wales	1·34	2·31
Cardiff C.B.	2·55	1·13
Merthyr Tydfil C.B.	1·02	—
Newport C.B.	0·59	1·77
Swansea C.B.	2·22	4·44
Administrative Counties:		
Anglesey	1·30	5·20
Brecknock	1·25	4·99
Caernarvon	2·38	4·17
Cardigan	1·48	7·42
Carmarthen	1·54	5·01
Denbigh	0·83	2·91
Flint	2·04	3·58
Glamorgan	2·42	2·92
Merioneth	—	1·82
Monmouth	2·96	3·52
Montgomery	—	1·43
Pembroke	2·25	1·50
Radnor	—	3·07

Housing Conditions in Scotland

Sir THOMAS MOORE asked the Secretary of State for Scotland whether, in view of the fact that over 250,000 houses were still required to replace unfit dwellings in Scotland and that, owing to the present condition of the building trade, it would not be possible to erect more than some 25,000 houses per annum, he could state what special steps he proposed to take to encourage temporary reconstruction and reconditioning in order to improve the present position.—Mr. WEDDERBURN replied: In view of the present pressure on the supply of building trade labour in Scotland, my right hon. friend is not satisfied on the information at present before him that a policy of temporary reconstruction and reconditioning would make any material contribution to housing needs, but following representations made to him by the Convention of Royal Burghs he is making further inquiries on the subject.

Hospital Staff at Gibraltar

Lieut.-Commander FLETCHER asked the Secretary of State for War whether the normal hospital staff at Gibraltar was too small to be able to cope with 35 unexpected patients, or whether there were other reasons, and, if so, of what nature, for the dispatch of four nurses to Gibraltar to nurse the wounded from the *Deutschland*.—Mr. HORE-BELISHA replied: The staff of the Military Hospital, Gibraltar, is adequate to deal with a normal number of patients. The casualties from the *Deutschland* were abnormal.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. A. G. Lee to *Pembroke* for R.N.B.

Surg. Lt.-Comdr. T. G. B. Crawford to be Surg. Comdr.

Surg. Lt.-Comdr. V. J. Fielding retires at own request.

Surg. Lt.-Comdr. R. V. Jones to *Wellington*.

Surg. Lts. G. L. Hardman, J. F. Meynell, W. S. Parker, and W. B. Teasey to *Victory* for R.N.B.; and I. C. Macdonald to *Falmouth*.

ROYAL NAVAL VOLUNTEER RESERVE

Proby. Surg. Lt. D. R. Maitland to be Surg. Lt.

ARMY MEDICAL SERVICES

Col. J. Heatly-Spencer, C.B.E., late R.A.M.C., having attained the age for retirement, is placed on ret. pay.

Lt. Col. W. H. O'Riordan, M.C., from R.A.M.C., to be Col.

Royal Army Medical College: Lt.-Col. and Bt.-Col. R. C. Priest, K.H.P., R.A.M.C., to be Professor of Tropical Medicine and Consulting Physician to the Army.

ROYAL ARMY MEDICAL CORPS

Maj. G. S. McConkey to be Lt.-Col.

TERRITORIAL ARMY

Capt. W. C. Armstrong to be Maj.

Lts. G. O. Brooks, F. G. Maitland, W. B. R. Monteith, and J. B. Bishop to be Capts.

R. M. McGregor (late Offr. Cadet, Edinburgh Univ. Contgt. (Med. Unit) Sen. Div., O.T.C.) to be Lt.

ROYAL AIR FORCE

Flight Lt. H. C. S. Pimblett is promoted to the rank of Squadron Leader.

Flying Offrs, promoted to the rank of Flight Lt.: J. R. R. Jenkins, E. W. R. Fairley, and R. C. O'Grady.

Flight Lt. T. J. M. Gregg to No. 4 Flying Training School, Abu Sueir, Egypt.

Dental Branch.—B. Blackburne to Medical Training Depôt, Halton, on appointment to a non-permanent commission as a Flying Offr. for three years on the active list.

AUXILIARY AIR FORCE

No. 600 (City of London) (Fighter) Squadron: J. H. Attwood is granted a commission as Flying Offr.

INDIAN MEDICAL SERVICE

The Commander-in-Chief in India has notified the following appointments:—

Col. W. J. Powell, C.I.E., as Assistant Director of Medical Services, Peshawar District, with effect from March 27th last.

Col. W. L. Watson, O.B.E., as A.D.M.S., Kohat District.

Lt.-Col. H. C. D. Rankin, O.B.E., as specialist in medicine, Deccan District.

Appts. made in India:—

A.D.M.S.: Col. T. C. C. Leslie, O.B.E., Brit. Serv.

D.A.D.M.S.: Maj. R. Murphy, R.A.M.C.

(*Continued at foot of opposite page*)

MEDICAL NEWS

University of Oxford

Dr. A. D. Gardner, director of the Standards Laboratory of the Medical Research Council, Oxford, has been appointed to a readership in bacteriology as from Oct. 1st, and the title of professor has been conferred on him for so long as he holds this office.

Dr. Gardner was educated at Oxford University and St. Thomas's Hospital, graduating in 1911. In the following year he was admitted to the fellowship of the Royal College of Surgeons of England and a year later he took his M.D. degree. From 1914 to 1917 he held a Radcliffe travelling fellowship and in 1923 he was awarded the prize for medical research. Dr. Gardner held the posts of demonstrator in morbid anatomy, research assistant, and house surgeon at St. Thomas's Hospital. He is a fellow of University College, Oxford, and the author of "Bacteriology for Medical Students and Practitioners" and of "Microbes and Ultramicrobes." He contributed the section on the dysentery group of bacilli to the Medical Research Council's "System of Bacteriology" in 1929. His work on whooping-cough has done much to introduce into this country the cough-droplet method of early diagnosis which he described in our columns in 1932.

Dr. E. S. Duthie has been appointed university demonstrator in pathology for four years from Oct. 1st.

University of Cambridge

On June 11th the following degrees were conferred :—

M.D.—F. W. Shepherd, T. R. Thomson, and E. W. Taylor.

M.B., B.Chir.—*D. G. Levis, *N. B. Betts, and *Guy Rigby-Jones, S. C. Buck, G. E. Loxton, A. E. M. Hartley, A. J. Moon, R. G. Pulvertaft, J. H. Lankester, and F. S. A. Doran.

M.B.—*K. G. F. Mackenzie, *T. V. Tattersall, J. S. Ellis, A. L. Jackson, H. S. Mellows, J. M. Scott, E. F. W. Grellier, and K. W. B. Rostron.

* By proxy.

Royal College of Surgeons of England

At a meeting of the council of the college held on June 10th with Sir Cuthbert Wallace, the president, in the chair, a letter was read from the Rockefeller Foundation presenting the sum of £500 for one year towards research work at the college. The honorary college medal was awarded to Sir Frank Colyer, in recognition of his many contributions to scientific odontology and to the service of the college. Sir Holburt Waring, who has been a member of the council since 1913, and who was president of the college from 1932–35, presented a silver cup to mark his retirement from the council.

Diplomas of fellowship were granted to the following :—

J. H. Mulvany, M.R.C.P. Lond., King's Coll. ; B. E. Fernando, L.R.C.P. Lond., Ceylon and St. Bart.'s ; V. H. Barnett, M.B. Lond., Univ. Coll. and Guy's ; H. G. Ungley, M.D. Durh., London Hosp. ; H. W. Burge, M.B. Lond., King's Coll. and West London ; A. H. Charles, M.B. Camb., St. George's and St. Thomas's ; A. B. Evans, M.B. Camb., Westminster and St. Bart.'s ; Ashton Miller, M.B. Camb., St. George's and St. Thomas's ; W. H. D. Trubshaw, L.R.C.P. Lond., St. Bart.'s ; C. F. Critchley, M.B. Lond., St. Thomas's and Guy's ; S. G. Mayer, L.R.C.P. Lond., London Hosp. ; Guy Blackburn, M.B. Camb., St. Bart.'s ; W. A. Law, M.B. Camb., London Hosp. ; B. N. Sinha, M.B. Lucknow, Middlesex and London Hosp. ; A. J. Helfet, M.B. Liverp. ; J. R. Rose, M.B. Camb., St. Thomas's ; W. R. Merrington, M.B. Lond., Univ. Coll. ; B. L. Williams, M.B. Camb., St. Thomas's ; K. G. F. Mackenzie, L.R.C.P. Lond., Cambridge and St. Thomas's ; Amarnath Mukerji, M.B. Calcutta, Middlesex and St. Bart.'s ; R. T. K. Nayar, M.B. Madras, London Hosp. and St. Bart.'s ; A. K. Talwalkar, M.B. Bombay, St. Bart.'s ; R. A. Hughes, M.B. Liverp. ; B. N. B. Rao, M.B. Bombay ; T. H. Ackland, M.D. Melb., St. Bart.'s ; W. S. Campbell, M.B. Belf., London Hosp. ; H. G. N. Cooper, B.M. Oxon., Guy's and West London ; K. R. Cussen, M.B. Melb., St. Thomas's and London Hosp. ; I. G. L. Ford, M.B. Dubl., Guy's and London Hosp. ; A. N. McCrea, M.B. Camb., St. Mary's and St. Thomas's ; S. K. Menon, M.B. Bombay, Guy's ; J. S. M. Pringle, M.B. Dub., London Hosp. ; H. J. Ross, M.B. Aberd., London Hosp. and Middlesex ; J. C. Scott, M.D. Toronto, St. Bart.'s and Radcliffe Inf. ; R. A. M. Yeates, M.B. Sydney ; and F. R. Yousry, M.B. Cairo, St. Bart.'s and Guy's.

A diploma of membership was granted to Alan William Woolley, and diplomas in anæsthetics were granted jointly with the Royal College of Physicians to the following :—

C. D. Banes, R. P. Booth, Elva M. Chivers, R. T. V. Clarke, R. W. Cope, Herbert Curtis, G. D. Drury, A. C. Fraser, A. H. Galley, J. L. Hopkins, Ernest Landau, I. N. Lewis, H. J. V. Morton, A. H. Musgrove, J. A. V. Nicoll, William Niven, Angela M. S. A. Ofenheim, G. S. W. Organe, F. H. Pratt, A. C. R. Rankin, O. N. Ransford, J. R. Ritchie, J. M. Savege (Major, R.A.M.C.), H. R. Sheppard (Major R.A.M.C.), J. T. Turner, R. C. Walch, and Doris E. C. Walker

At the recent primary examination for the fellowship the following candidates were successful :—

P. Berbrayer, M.D. Manitoba, Univ. Coll. ; J. A. W. Bingham, M.B. Belf., Middlesex ; Ruth E. M. Bowden, Roy. Free ; A. C. Brewer, M.B. Liverp. ; A. J. Broomhall, L.R.C.P. Lond., Univ. Coll. and Middlesex ; D. M. F. Carter, Guy's ; G. H. D. Channing, Guy's ; L. P. Clark, M.B. N.Z., Univ. Coll. and Middlesex ; S. Eisenhammer, M.B. Edin., Cape and Univ. Coll. ; R. D. Ewing, M.B. Camb., Middlesex ; Frances V. Gardner, Roy. Free ; A. Gourevitch, M.R.C.S. Eng., Birm. and Middlesex ; I. H. Griffiths, M.B. Lond., Middlesex ; E. O. Harris, M.B. Lond., Middlesex ; E. C. Herten-Greaven, M.B. Camb., Lond. Hosp. ; J. Heselson, M.B. Cape Town, Univ Coll. ; W. B. Highet, M.B. N.Z., Univ. Coll. ; W. G. Holdsworth, M.B. Melb. ; A. H. Hunt, B.M. Oxon., Univ. Coll. and St. Bart.'s ; A. J. Innes, M.B. Edin., Univ. Coll. and Middlesex ; R. Ismail, M.B. Cairo, Univ. Coll. and St. Bart.'s ; E. S. James, M.D. Manitoba, Middlesex and Univ. Coll. ; A. B. King, M.B. Lond., Univ. Coll. ; G. H. Kitchen, M.D. Toronto, Univ. Coll. and Middlesex ; R. A. V. Lewys-Lloyd, M.B. Lond., St. Bart.'s ; J. F. Lipscomb, M.B. Sydney, Univ. Coll. and Middlesex ; L. Lloyd-Evans, Edin. and Middlesex ; T. G. Lowden, B.M. Oxon., Univ. Coll. and Middlesex ; S. D. Loxton, M.B. Brist., Univ. Coll. and Middlesex ; H. M. McGladdery, M.B. Lond., St. Bart.'s and Middlesex ; T. J. B. A. MacGowan, M.B. Glasg., Middlesex ; Rosamund M. I. Mackay, M.B. Lond., Univ. Coll. ; H. E. M. Martin, M.B. Dubl., Univ. Coll. and Middlesex ; K. Mazhar, M.B. Cairo, Middlesex and Lond. Hosp. ; A. M. Minaisy, M.B. Cairo, Middlesex and Univ. Coll. ; B. P. Moore, St. Thos. ; B. L. Morgan, Middlesex ; G. N. Morris, M.B. Melb., Middlesex and Univ. Coll. ; A. L. Newson, M.B. Melb. Univ. Coll. ; H. R. C. Norman, M.D. Toronto, Middlesex and Univ. Coll. ; M. D. M. O'Callaghan, St. Bart.'s ; J. G. O'Donoghue, M.B. Melb., Univ. Coll. ; M. K. Parikh, M.B. Bombay, Middlesex ; W. D. Park, M.B. Lond., Middlesex and St. Bart.'s ; W. Parke, M.B. Liverp. ; D. G. Phillips, M.B. N.Z., Univ. Coll. ; J. G. Pyper, M.B. Belf. ; S. C. Raw, M.B. Durh. ; M. J. Riddell, St. Thos. ; A. F. Rushforth, Guy's ; M. L. A. Samie, M.B. Cairo, Middlesex and Univ. Coll. ; A. H. Sangster, M.D. Dalhousie, Univ. Coll. ; A. H. M. Siddons, M.B. Camb., Univ. Coll. ; A. J. Slessor, M.B. Aberd., Middlesex ; H. A. Small, M.B. N.Z., Univ. Coll. and Middlesex ; R. Spencer, M.B. Manch., Durham ; K. R. Thomas, M.B. N.Z., Univ. Coll. ; D. M. Thomson, M.D. Manitoba, Middlesex and Univ. Coll. ; G. M. Thomson, M.B. Sydney ; A. J. Walker, St. Bart.'s ; A. Wardale, M.B. Lond., Univ. Coll. ; D. Wynn-Williams, Univ. Coll. and Middlesex ; J. F. Ziegler, M.B. Melb., St. Mary's ; and A. Zinovieff, Middlesex.

The following examiners were elected for the ensuing year :—

Dental Surgery.—Surgical Section : Mr. C. P. G. Wakeley, Mr. C. E. Shattock, Mr. P. H. Mitchiner, Mr. E. G. Slesinger, Mr. Reginald Vick, and Mr. Basil Hume. Medical Section : Dr. R. A. Rowlands, Dr. A. H. Douthwaite, Dr. R. A. Hickling, and Dr. Charles Newman.

Primary Fellowship.—Anatomy : Mr. P. N. B. Odgers, Prof. H. H. Woollard, Prof. R. B. Green, and Mr. E. P. Stibbe. Physiology : Prof. Hamilton Hartridge, Prof. John Mellanby, Prof. D. T. Harris, and Prof. A. St. G. J. Huggett.

Diplomas of L.R.C.P., M.R.C.S.—Elementary Biology : Mr. W. A. Cunnington, Mr. A. E. Ellis, Mr. S. R. B. Pask, and Mr. Wilfrid Rushton, D.Sc. Anatomy : Mr. E. P. Stibbe, Dr. A. J. E. Cave, Prof. W. J. Hamilton. Physiology : Prof. A. St. G. J. Huggett, and Prof. Samson Wright. Midwifery : Mr. A. C. Palmer, Mr. Victor Lack, Mr. Trevor Davies, and Dr. Wilfred Shaw. Pathology : Prof. James McIntosh, Dr. W. G. Barnard, Mr. B. W. Williams, and Mr. D. H. Patey.

Diploma in Public Health.—Part I : Major-General H. J. M. Perry. Part II : Dr. Charles Porter.

Diploma in Tropical Medicine and Hygiene.—Major-General W. P. MacArthur and Dr. Hamilton Fairley.

Diploma in Ophthalmic Medicine and Surgery.—Part I : Mr. Leighton Davies and Mr. Affleck Greeves. Part II : Mr. Foster Moore.

Diploma in Psychological Medicine.—Prof. F. L. Golla.

Diploma in Laryngology and Otology.—Part I : Mr. Sydney Scott and Mr. Edward Carew-Shaw. Part II : Mr. T. B. Layton.

Diploma in Medical Radiology.—Part I : Dr. H. T. Flint. Part II : Dr. Hugh Davies.

Diploma in Anæsthetics.—Dr. H. E. Gaskin Boyle.

Diploma in Child Health.—Dr. A. G. Maitland-Jones.

(*Continued from previous page*)

Appts. vacated in India :—

A.D.M.S. : Col. A. E. S. Irvine, D.S.O., V.H.S., Brit. Serv.

Embn. Med. Offr. : Maj. A. J. Bado, R.A.M.C.

Capt. P. K. S. Gupta resigns his temp. commn.

COLONIAL MEDICAL SERVICE

Surg. Lt. P. H. Stone has been appointed Medical Officer, Kenya. Dr. W. P. H. Lightbody (Palestine) becomes Assistant Director of Medical Services (Health), Sierra Leone ; Dr. J. Naudi (M.O.), Senior Medical Officer, Nigeria ; Dr. W. Nelson (Nigeria), Senior Medical Officer, Gold Coast ; Dr. R. Nicklin (Zanzibar), Medical Officer, Nyasaland ; and Dr. A. M. W. Rae (Gambia), Assistant Director of Medical Service, Gold Coast.

University of Wales

At recent examinations the following candidates were successful in obtaining the tuberculosis diseases diploma :—

A. A. Azeez, M. P. Crowe, B. A. Dormer, M. C. Malkani, C. F. McConn, K. P. R. Pillai, N. N. Sen, H. K. Surveyor, G. R. Talwalker, and Helen Turner.

University of Sheffield

Dr. Gilbert Forbes has been appointed lecturer in forensic medicine and Dr. J. M. Kennedy lecturer in infectious diseases. Dr. J. Webster Bride has been appointed examiner in obstetrics for the final M.B. examination in September.

Middlesex Hospital Medical School

On Wednesday, July 21st, at the Scala Theatre, Lord Dawson will distribute the prizes gained during the past year by students of this school. Dr. G. E. Beaumont will deliver an introductory address entitled the Breath of Life. The wards of the hospital, the medical school and research departments, and the nurses' home will be open to inspection after the prize-giving.

Queen's Hospital for Children, Hackney

This hospital is undertaking an extension and reconstruction scheme which will cost £50,000. Of this £30,000 must still be raised if the buildings are to be opened free of debt.

National Smoke Abatement Society

The offices of this society are being transferred from Manchester to London, and after Thursday, June 24th, the address to which all communications should be sent will be: Chandos House, 64, Buckingham-gate, Westminster, S.W.1. The society's present London address at 71, Eccleston-square will no longer be used except where the personal attention of Sir Lawrence Chubb is desired.

Forthcoming Congresses

Meetings which have been arranged for the future include the following :—

June	19th–23rd	Journées Médicales de Bruxelles.	Brussels.
,,	21st–25th	Silicosis Symposium.	Saranac Lake, N.Y.
,,	26th–30th	Journées Médicales Internationales de Paris.	Paris.
July	1st–3rd	National Association for the Prevention of Tuberculosis.	Bristol.
,,	5th–11th	International Hospital Congress.	Paris.
,,	8th–10th	Oxford Ophthalmological Congress.	Oxford.
,,	12th–17th	International Short-wave Congress.	Vienna.
,,	19th–24th	International Congress on Mental Hygiene.	Paris
,,	20th–24th	British Medical Association.	Belfast.
,,	24th–Aug. 1st	International Congress of Child Psychiatry	Paris.
July	29th–Aug. 1st	Population Congrès	Paris.
Aug.	5th–7th	Internationale Gesellschaft für Geographische Pathologie.	Stockholm.
,,	29th–Sept. 4th	International Swiss Medical Week.	Interlaken
Sept.	1st–8th	British Association	Nottingham.
,,	5th–9th	International Union Against Tuberculosis.	Lisbon.
,,	13th–17th	International Congress of Radiology.	Chicago.
,,	13th–15th	International Society of Gastro-enterology.	Paris
,,	16th–18th	International Congress on Hepatic Insufficiency.	Vichy.
,,	27th–30th	International Child Welfare Congress.	Rome.
Oct.	2nd–4th	International Congress for Psychotherapeutics.	Copenhagen.
,,	9th	International Rheumatism Congress.	Paris.
,,	17th–22nd	International Society of Medical Hydrology.	Wiesbaden and Frankfurt.
Dec.	8th–15th	International Congress of Ophthalmology.	Cairo.
1938 March	21st	International Leprosy Conference.	Cairo.
,,	26th–31st	International Congress on Rheumatism and Medical Hydrology	Oxford.
September		International Surgical Society.	Vienna.

Newbury District Hospital

This institution has been remodelled and extended at a cost of some £24,000 and the new buildings were opened lately by Mr. A. Thomas Lloyd, His Majesty's Lieutenant of Berkshire. Two wings have been added to form new men's and women's wards and the accommodation has been increased from 36 to 64 beds.

A National Dental Service

Sir Kingsley Wood, the Minister of Health, accompanied by Mr. R. H. Bernays, parliamentary secretary to the Ministry, on Tuesday last received a deputation representing the British Dental Association, the Incorporated Dental Society, and the Public Dental Service Association. The deputation emphasised the need for a comprehensive dental service, as an essential sequel to the school dental service, which would provide dental inspection and treatment for every insured person. This could only be made possible by means of a statutory dental benefit. The service should be organised on a panel system similar to that in force for medical benefit, and the dentists, like the insurance medical practitioners, should be remunerated on a capitation basis. Sir Kingsley Wood said in reply that over 10 million persons—two-thirds of the whole insured population of England and Wales—were already entitled to dental treatment as an additional benefit and that the scope of the existing scheme would be considerably extended by the new proposals for bringing juveniles into National Health Insurance. It was clear that the cost of providing dental benefit as a statutory benefit would be very heavy and would raise the question of an increase in the contributions paid by insured persons and their employers. He was nevertheless much impressed by the arguments put forward and promised to give them careful consideration.

Harveian Society of London

At the Buckston Browne dinner held at the Connaught Rooms on June 10th, Lord Hewart proposed the toast of the Society and said he thought doctors had little to fear from the Recording Angel. Dr. A. H. Douthwaite, responding as president, announced that despite a doubling of its subscription the Society now had over 400 members. Its present stability would have been impossible but for the ten years' devoted work of Dr. de Bec Turtle, whose latest benefaction was the gift of a cigarette box and snuffbox in celebration of Coronation year; while the dinner itself was one of the many manifestations of the generosity of Sir Buckston Browne. Mr. M. F. Nicholls having ingeniously proposed the Guests, Mr. H. L. Eason was led from thoughts of Harvey and the circulation of the blood to speculations about other circulations—of the port, of the press, and of London traffic, this last being sadly impaired by arterio-sclerosis, ischæmia, and clots in all the main arteries, with an occasional coronary thrombosis near the Bank of England. The next speaker, appropriately enough, was Mr. Ernest Bevin, whose feelings about the bus strike caused him to appeal for closer relations between medicine and industry. He wished that doctors would take less interest in incidence and more in causation—that they would act as a look-out brigade and not postpone action until disease had killed a large number of people. The new chemical and machine age, coming so suddenly, had produced a situation in which all must coöperate to find a remedy. There was a growing desire to bring discovery and practice closer together, and nowhere was this more necessary than in medicine. The greatest sufferers from the gap were the working people: they paid a very large proportion of their income for medical service and were not quite getting value for money. There was not yet the right organisation for getting the right results; the service, with its long waits at institutions and its failure to include women and children, was not organised for the present generation. "What I resent more than anything else," said Mr. Bevin, "is the discrimination between those with one salary and those with another. Why a man should be classed as proletariat at £5 a week and as lower middle-class at £5 1*s.* passes my comprehension."

Mr. Derek Curtis-Bennett in the final speech of the evening spoke of what everybody owed—"not only in pounds, shillings, and pence"—to the medical profession.

Dr. Christopher Addison, on whom a peerage was conferred in the Coronation Honours, has taken the title of Baron Addison, of Stallingborough in the county of Lincoln.

Salvation Army Mothers' Hospital

Lady Baldwin, on June 8th, opened a new isolation block at this hospital in Lower Clapton-road. The block cost £8785.

Disposal of the Dead

The sixth joint conference of the National Association of Cemetery and Crematorium Superintendents and the Federation of Cremation Authorities in Great Britain will be held at Torquay from June 28th to July 1st.

West London Hospital

Prince Arthur of Connaught presided at the annual meeting of subscribers of this hospital and stated that 4441 in-patients were received last year. Maintenance alone amounted to £65,300. The new buildings are to be officially opened by Queen Mary on Oct. 18th and will be named the Silver Jubilee extensions.

St. Thomas's Hostel for Babies, Kennington

On June 7th Princess Helena Victoria opened the new nurses' home attached to this institution. She also received purses towards the £6,000 which is the cost of the building.

Lady Tata Memorial Grants and Scholarships

The trustees of this fund have awarded scholarships for research in blood diseases, with special reference to leukæmia to: Dr. Jörgen Bichel (Aarhus, Denmark) and Dr. Edoardo Storti (Pavia, Italy). They have also awarded grants for research expenses or for scientific assistance to the following: Dr. Julius Engelbreth-Holm (Copenhagen); Prof. Karl Jármai (Budapest); Prof. James McIntosh (London); Prof. Charles Oberling (Paris); Prof. Eugene Opie and Dr. Jacob Furth (New York); Dr. Georg Weitzmann (Leipzig); and Dr. Lucy Wills (London).

British Association of Radiologists

After holding its first annual general meeting at Birmingham in 1935 and its second at Manchester in 1936 this association came to London for its third annual meeting which was held on June 11th and 12th at the Reid-Knox Hall, Welbeck-street, under the presidency of Prof. J. M. Woodburn Morison. The discussions are briefly reported on an earlier page. On the evening of the 11th some ninety members and their friends dined together at the Hotel Splendide, Piccadilly; the diagnostic and the therapeutic groups were both well represented. In proposing "The Association," Mr. S. J. Worsley, acting principal of London University, spoke of its aim to combine the conservative outlook of medicine with a quick adaptation to new ideas. London University, he said, still had the only chair of radiology in this country, and its diploma of medical radiology was now a going concern, some eight of the London school being prepared to take part in preparing for it. Dr. R. M. Beath, who will preside next year when the Association meets in Belfast, paid a tribute to the previous occupants of the presidential chair who had done so much to improve the education and status of the radiologist. He mentioned the decision to establish a higher diploma and an intention sometime to found a college of radiology. Dr. R. E. Roberts (Liverpool) proposed "The Guests," mentioning Miss Skinner who had generously endowed a lectureship, Sir Cuthbert Wallace, who was president of a college on whose regulations for the fellowship the Association had moulded its own, and Dr. Lysholm of Stockholm, who was not only the fountain head of radiology in Sweden, but also an expert yachtsman and engineer. Sir Walter Langdon-Brown, in replying, suggested possible mottoes for the Association, amongst them (1) "What shadows we pursue," (2) "For now we see through a glass darkly." The President concluded by giving as an extra toast "Absent Friends," with a special message to Mr. Thurstan Holland, prevented by his health from attending. Other guests present were Mr. Rock Carling and Mr. Dickson Wright.

Appointments

BAKER, ALFREDA H., M.D. Belf., F.R.C.S. Eng., Temporary Assistant Surgeon to the Elizabeth Garrett Anderson Hospital.

BEAUCHAMP, GUY, M.B. Birm., Hon. Physician to the Charterhouse Rheumatism Clinic, London.

BURGE, H., M.B. Lond., F.R.C.S. Eng., Resident Surgical Officer at King George Hospital, Ilford.

COOPER, H. G. N., B.M. Oxon., F.R.C.S. Eng., Resident Surgical Officer at the Ancoats Hospital, Manchester.

HILL, GLADYS, M.D. Lond., F.R.C.S. Eng., M.C.O.G., Temporary Assistant Obstetric Surgeon to the Elizabeth Garrett Anderson Hospital.

IRVINE, DUNDAS, M.R.C.S. Eng., Hon. Anæsthetist to the Charterhouse Rheumatism Clinic, London.

JONES, L. E., M.B. Lond., F.R.C.S. Eng., Resident Surgica Officer at the Queen's Hospital, Birmingham.

JONES-DAVIES, T. E., M.A. Camb., M.R.C.P. Lond., Assistant Medical Officer for Surrey.

JORY, N. A., B.Sc. N.Z., F.R.C.S. Eng., Assistant Aural Surgeon at St. Bartholomew's Hospital.

KANE, WINIFRED A., M.R.C.S. Eng., Lady Assistant Medical Officer for Coventry.

MACKIE, J. R. M., M.D. Aberd., M.R.C.P. Lond., Medical Registrar at King George Hospital, Ilford.

MOLL, H. H., M.D. Rome, M.R.C.P. Lond., Hon. Physician to the Leeds General Infirmary.

SCOWEN, E. F., M.D., M.R.C.P. Lond., Assistant Physician and Assistant Director to the Medical Professorial Unit at St. Bartholomew's Hospital.

SHIELDS, CLIVE, B.M. Oxon., Physiotherapist to the Victoria Hospital for Children, Chelsea.

Princess Alice Memorial Hospital, Eastbourne.—The following appointments are announced:—

ESTCOURT, H. G., M.B. Lond., F.R.C.S. Edin., Hon. Surgeon;

EMSLIE, A. G., M.D. Aberd., D.P.H., Hon. Assistant Physician; and

SNOWBALL, L. A. H., M.B., M.R.C.P. Lond., F.R.C.S. Edin., Hon. Assistant Surgeon.

Queen Charlotte's Maternity Hospital.—The following appointments are announced:—

MEEK, EDWARD, M.D. Toronto, L.B. Dubl., Senior Resident Medical Officer;

LLOYD, OSWALD, M.R.C.S. Eng., Assistant Resident Medical Officer;

EVANS, E. P., M.R.C.S. Eng., Resident Anæsthetist and District Resident Medical Officer; and

GIBB, ANN, M.B. Edin., Resident Anæsthetist.

Vacancies

For further information refer to the advertisement columns

Aberdeen, Rowett Research Institute.—Biochemist, £300. Also Med. Grad. to assist in Research, £35–£45 per month.
Ashton-under-Lyne District Infirmary.—H.S., at rate of £150. Also Cas. H. S., £180.
Barnsley, Beckett Hosp. and Dispensary.—Jun. H.S., also H.P. each £200.
Bath, Royal United Hosp.—H.P., at rate of £150.
Bedford County Hosp.—Second H.S., at rate of £150.
Bermondsey Borough.—Asst. Tuberculosis O., £600.
Birkenhead Education Committee.—Asst. School M.O., £500.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130 to £150.
Birmingham, Queen's Hosp.—Res. Anæsthetist, £70–£100.
Birmingham, Selly Oak Hosp. and Infirmary.—Supt. Matron, £450. Also Jun. M.O.'s for Hospital, each at rate of £200.
Board of Education.—Medical Officer, £738.
Bolton Royal Infirmary.—Two H.S.'s, each at rate of £150.
Bolton, Townley Hosp., Farnworth.—Asst. M.O., £225.
Brighton, New Sussex Hosp. for Women.—H.P., £104.
Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.
Bristol Royal Infirmary &c.—Radio-diagnostician (Locum), at rate of £500.
British Postgraduate Medical School, Ducane-road, W.—Cas. O., at rate of £150.
British Red Cross Society Clinic for Rheumatism, Peto-place, N.W.—Hon. Dental Surgeon.
Cambridge, Addenbrooke's Hosp.—Res. Anæsthetist and Emergency O., at rate of £130.
Cardiff City Lodge Hosp.—Jun. Res. M.O., £150.
Cardiff, University College of S. Wales and Mon.—Asst. Lecturer in Dept. of Anatomy.
Carlisle, Cumberland Infirmary.—H.S., at rate of £155.
Cassel Hosp. for Functional Nervous Disorders, Swaylands, Penshurst, Kent.—Med. Director, £1200–£1500.
Charing Cross Hosp, W.C.—Hon. Orthopædic Surgeon. Also Hon. Clin. Asst. to X Ray and Electrotherapeutics Dept.
Chelmsford C.C.—Temporary Tuber. O., £15 per week.
Cheltenham General and Eye Hosp.—H.P., £150.
Chesterfield and North Derbyshire Royal Hosp.—Res. Surg. O., £300. Also H.S., at rate of £150.

Coventry and Warwickshire Hosp.—H.P., £160, Res. H.S., and Cas. O., each £150.
Devonport, Prince of Wales's Hosp.—Jun. H.S., at rate of £120.
Durham County Hosp.—H.S., at rate of £150.
Eastbourne Royal Eye Hosp., Pevensey-road.—H.S., £100.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Hon. Asst. Phys. Also H.P., First and Second H.S.'s, and Obstet. Asst., each at rate of £50.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.P., Locum. £4 4s. weekly.
Exeter, Royal Devon and Exeter Hosp.—H.S., at rate of £150.
Federated Malay States, Central Mental Hosp.—Asst. Med. Supt., £840.
Gateshead Mental Hosp., Stannington, Northumberland.—Asst. M.O., £350.
Gloucestershire Royal Infirmary and Eye Institution.—H.S. and H.P., each at rate of £150.
Halifax, Royal Infirmary.—First H.S., at rate of £200.
Herefordshire General Hosp.—Res. Surg. O. and H.P., at rate of £150 and £100 respectively.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P., at rate of £100.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. M.O. for Country Branch, at rate of £200.
Hosp. for Tropical Diseases, 25, Gordon-street, W.C.—Ophth. Surg.
Hosp. for Women, Soho-square, W.—Hon. Clin. Assts.
Huddersfield, St. Luke's Hosp.—Res. M.O., £230.
Hull, Beverley-road Institution.—Asst. M.O.'s, £350.
Hull Royal Infirmary.—Second H.P. and H.S. to Ophth. and Ear, Nose and Throat Depts., each at rate of £150.
Ipswich, East Suffolk, and Ipswich Hosp.—Cas. O., H.S. to Orthopædic and Fracture Dept., and H.S. to General Surgeon and Genito-Urinary Surgeon, each £144.
Kettering and District General Hosp.—H.S. and H.P., at rate of £175 and £150, respectively.
Kidderminster and District General Hosp.—Jun. H.S., £100.
King's College Hosp., Denmark-hill, S.E.—Asst. Neurologist.
Leeds, Killingbeck Sanatorium.—Asst. Res. M.O., £250.
Leicester Royal Infirmary.—Pathologist (Locum), £10 weekly.
Liverpool, Cleaver Sanatorium for Children, Heswall.—Res. M.O. £300.
London Chest Hosp., Victoria Park, E.—Asst. Tuberculosis O., £600.
London University.—Examinerships.
Manchester, Ancoats Hosp.—Cas. O., £250. Also H.S. to Ear, Nose and Throat Dept., at rate of £100.
Manchester Ear Hosp., Grosvenor-square.—Res. H.S., £120.
Manchester Royal Children's Hosp., Pendlebury.—Res. M.O. and Res. H.S., at rate of £150 and £100 respectively.
Manchester Royal Infirmary.—Technical Asst. for Clinical Laboratory Work, £200.
Marie Curie Hosp, 2, Fitzjohn's-avenue, N.W.—Asst. Director, from £500.
Middlesbrough, North Riding Infirmary.—Sen. H.S. and Third H.S., at rate of £175 and £140 respectively.
Middlesex County Council.—Visiting Dental Surg., 2 guineas per session.
Northampton General Hosp.—H.S., at rate of £150.
North Middlesex and County Hosp., Edmonton.—Asst. M.O., at rate of £350. Also Jun. Res. Asst. M.O., at rate of £250.
Norwich Infirmary.—Res. Asst. M.O., £350.
Norwich, Norfolk and Norwich Hosp.—Gen. H.S., H.S. to Orthopædic Dept. Also Cas. O., each £120.
Nottingham General Hosp.—Res. Cas. O. and H.S. to Ear, Nose, and Throat Dept., each at rate of £150.
Oldham Municipal Hosp.—Res. Asst. M.O., at rate of £200.
Oldham Royal Infirmary.—Two H.S.'s. Also Cas. O. and H.S. to Fracture Dept., each at rate of £175.
Plymouth, Prince of Wales's Hosp.—H.S. and H.P., at rate of £120.
Pontefract General Infirmary.—Jun. Res. M.O., at rate of £150.
Port of Spain City Council.—M.O.H., £800.
Preston and County of Lancaster Royal Infirmary.—Two H.S.'s, each at rate of £150.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—H.S., at rate of £120–£150.
Queen's Hosp. for Children, Hackney-road, E.—Additional Visiting Anæsthetist, 1 guinea per attendance.
Queen Mary's Hosp. for the East End, Stratford, E.—Cas. and Out-Patient O., at rate of £150. Also Anæsthetist.
Reading, Royal Berkshire Hosp.—H.S. Also Cas. O., each at rate of £150.
Rotherham Hosp.—H.S. for Ophth. and Ear, Nose, and Throat Depts., £120.
Royal National Orthopædic Hosp.—Two H.S.'s for Country Branch, each at rate of £150.
St. George's Hosp., S.W.—Asst. Physician.
St. Mary's Hosp., W.—Cas. H.P., at rate of £150.
Sheffield Children's Hosp.—H.S., £100.
Sheffield Royal Hosp.—Cas. O., at rate of £150.
Shrewsbury, Royal Salop Infirmary.—Res. H.S., at rate of £160.
Smethwick County Borough.—Sen. Asst. M.O.H., &c., £750. Also Asst. M.O.H., &c., £350.
Southampton, Royal South Hants and Southampton Hosp.—Cas O., and Res. Anæsthetist and H.S. to Ear, Nose, and Throat Dept., each at rate of £150.
South Eastern Hosp. for Children, Sydenham, S.E.—Two R.M.O.'s each at rate of £100.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.S., at rate of £175.
Stoke-on-Trent, Longton Hosp.—H.S., £160.
Sunderland Royal Infirmary.—Res. Surg. O., £250. Also Cas. O., £150.
Swansea General and Eye Hosp.—H.S., at rate of £150.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. and Cas. O., £150.
Warwick, King Edward VII Memorial Sanatorium, Hertford Hill. Jun. Asst. M.O., £250.
Weir Hosp., Grove-road, Balham, S.W.—Jun. Res. M.O., £150.
West Ham Mental Hosp., Goodmayes.—Jun. Asst. M.O., £350.
West Middlesex County Hosp., Isleworth.—Surgeon, Grade I, £1000.
Westminster Hosp., Broad Sanctuary, S.W.—Dental Surgeon.
Whipps Cross Hosp., Leytonstone, E.—Asst. Res. M.O., £350.
Willesden General Hosp., Harlesden-road, N.W.—Cas. O., at rate of £100.
Winchester, Royal Hampshire County Hosp.—H.S., at rate of £125.
Wolverhampton Royal Hosp.—Hon. Asst. Surgeon and Hon. Asst. Gynæcologist.
Worksop, Victoria Hosp.—Jun. Res., at rate of £130.
Yiewsley and West Drayton Urban District.—M.O.H., £125.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

SATURDAY, June 26th.

Orthopædics: provincial meeting in Exeter. 1.45 P.M., Demonstration of Cases at the Princess Elizabeth Orthopædic Hospital.

MEDICO-LEGAL SOCIETY.

THURSDAY, June 24th.—8.15 P.M. (Manson House, 26, Portland-place, W.), annual general meeting. Miss Alice Raven: Prejudicial Assumptions in Poison Cases.

BRITISH PSYCHOLOGICAL SOCIETY.

Medical Section.

WEDNESDAY, June 23rd.—8.30 P.M. (11, Chandos-street, W.), Dr. J. L. Halliday: The Approach to Asthma.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

NATIONAL COUNCIL FOR MENTAL HYGIENE.

TUESDAY, June 22nd.—3 P.M. (26, Portland-place, W.), annual general meeting. 4.30 P.M., Dr. Henry Yellowlees: Mental Hygiene in the Home.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.

THURSDAY, June 24th.—9 P.M., Sir Arthur MacNalty: The Doctor in Politics and Diplomacy.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY, June 22nd.—4.30 P.M., Dr. D. Hunter: Occupational Diseases.

WEDNESDAY.—12 noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Carbohydrate Metabolism and Diabetes. 3 P.M., clinical and pathological conference (surgical).

THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3 P.M., operative obstetrics.

FRIDAY.—3 P.M., clinical and pathological conference (obstetrics and gynæcology).

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, June 21st, to SATURDAY, June 26th.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. Afternoon M.R.C.P. course in neurology.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. All-day course in gynæcology.—LONDON CHEST HOSPITAL, Victoria Park. Wed. and Fri., 6 P.M., M.R.C.P. course in heart and lung diseases.—BROMPTON HOSPITAL, S.W. Twice weekly, 5 P.M., M.R.C.P. course in chest diseases. Open only to members of the fellowship.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.

THURSDAY, June 24th.—3 P.M., Dr. Blake Pritchard: Demonstration.

ST. MARY'S HOSPITAL, W.

TUESDAY, June 22nd.—5 P.M. (Institute of Pathology and Research), Dr. W. E. Gye: Recent Work on Cancer.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, June 24th.—2 P.M., Mr. Eric Lloyd: Spinal Deformities in Children. 3 P.M., Dr. A. Signy: Interpretation of Fæcal Bacteriology.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

WEDNESDAY, June 23rd.—12.30 P.M., Visit to Parke, Davis and Co., Hounslow.

NOTES, COMMENTS, AND ABSTRACTS

KIPLING AND DOCTORS *

BY VICTOR BONNEY, M.S.

No writer has depicted the technical and spiritual aspects of medicine so understandingly as Rudyard Kipling, and therein medical men are in debt to him for ever. Unlike the problems of other callings those presented to the doctor, concerned as they are with the shifting phenomena of life, are contained in no fixed framework of laws whereby they may be measured and solved, so that for an outsider to conceive and don the mental response to them requires not only great imagination but profound observation and thought as well. Kipling's understanding is assignable, firstly, to that insatiable craving for inner knowledge which was so striking a part of his nature and which compelled him to observe minutely and study the details of every sort of work; and secondly, to his power of vision which perceived in all work a spiritual significance far greater than the work itself. He himself has described to us how in his earlier days he was by force of circumstances brought into intimate relation with men of many varied callings:

"and in that Club and elsewhere I met none but picked men at their definite work—Civilians, Army, Education, Canals, Forestry, Engineering, Irrigation, Railways, Doctors and Lawyers, and each talking his own shop. It follows then that the show of technical knowledge for which I was blamed later came to me from the horse's mouth—even to boredom."

But medicine had, I think, a special attraction for Kipling, probably because its subtle problems challenged his deeply inquiring mind. In "Something of Myself" two doctors have specific mention, Dr. Conland, "the best friend I made in New England," and the late Sir John Bland-Sutton with whom, as readers of the biography will remember, Kipling pursued an unwilling cock to verify the workings of its gizzard. Bland-Sutton was a very remarkable person, avid for the acquirement of knowledge, especially if the knowledge concerned matters odd and unthought-of, and he was moreover gifted with the faculty of viewing things from an angle quite different from that used by the ordinary man. He possessed, in short, the very type of mind to interest and attract a mind like Kipling's, and an old-standing and intimate friendship subsisted between them. He is introduced as Sir James Belton into the story "The Tender Achilles."

"In the few precisely articulated words one could see Sir James himself—his likeness in face and carriage to the hawk-headed Egyptian god, the mobile pursed lips and the stillness of the wonderful hands at his sides."

The portrait is quite unmistakable to those who knew this famous surgeon. The "St. Peggotty's" of the tale is the Middlesex Hospital, to which Bland-Sutton gave a fully equipped pathological institute. His bust stands in the museum which forms a part of it, and underneath the bust is this epitaph written by Kipling.

JOHN BLAND-SUTTON
A SEEKER AFTER KNOWLEDGE THAT SHOULD AVERT OR MITIGATE PAIN
Labouring throughout life to this end,
he gave greatly of his substance that
the search should continue in this place.

His Knowledge of Medicine

Evidences of Kipling's knowledge of the technical side of medicine are numerous. For instance, from "The Spies' March," which deals with medical men in relation to infectious disease, take the following verse:

"Go where his pickets hide—
Unmask the shape they take,
Whether a gnat by the waterside,
Or a stinging fly in the brake,
Or filth of the crowded street,
Or a sick rat limping by,
Or a smear of spittle dried in the heat,
That is the work of a spy!"

In "A Deathbed" the last two lines of the first verse accurately describe the outward signs of malignant disease of the throat or tongue:

"This is a gland at the back of the jaw,—
And an answering lump by the collar-bone."

Witness his reference to bacteriology in "A Translation."

"Some cultivate in broths impure
The clients of our body—these
Increasing without Venus, cure
or cause, disease."

In "Marklake Witches" one of the characters is René Laennec, the French physician who by his invention of the stethoscope laid the foundation of our knowledge of diseases of the heart and lungs. René in the story is a prisoner of war on parole and Philadelphia tells Dan and Una how she watched René demonstrating his "little wooden trumpet" to Jerry, the local seller of charms and cures. Jerry listening to René's chest says:

"But unless I've a buzzin' in my ears Mosheur Lanark you make much about the same kind of noises as old Gaffer Macklin, but not quite so loud as young Copper—It sounds like breakers on a reef, a long way off. Comprenny?" "Perfectly" replies René, "I drive on the breakers. But before I strike I shall save hundreds, thousands, millions perhaps, by my little trumpets."

The earliest stethoscopes were made of wood and were shaped like a short trumpet. Jerry's picturesque simile exactly describes "tubular breathing," and how fine is René's reply!

But the fullest example of the accuracy of his medical knowledge is to be found in "The Ballad of Boh Da Thone"—You remember:

"Boh Da Thone was a warrior bold;
His sword and his rifle were bossed with gold,
And the Peacock Banner his henchmen bore
Was stiff with bullion but stiffer with gore.
He shot at the strong and he slashed at the weak
From the Salween scrub to the Chindwin teak:
He crucified noble, he sacrificed mean,
He filled old ladies with kerosene!"

He is pursued by Captain O'Neil of the Black Tyrone:

"And his was a company seventy strong,
Who hustled that dissolute chief along."

* Abridged from a paper read before the Kipling Society on June 15th, 1937.

O'Neil and his men eventually overtake him:

"And at last they came when the Daystar tired,
To a camp deserted—a village fired,
A black cross blistered the morning-gold,
But the body upon it was stark and cold.
The wind of the dawn went merrily past,
The high grass bowed her plumes to the blast.
And out of the grass on a sudden broke
A spirtle of fire, a whorl of smoke—
And Captain O'Neil of the Black Tyrone
Was blessed with a slug in the ulna bone—
The gift of his enemy Boh Da Thone."

Now mark Kipling's medical knowledge:

"Now a slug that is hammered from telegraph wire
Is a thorn in the flesh and a rankling fire."

The wound suppurates as it would be sure to do.

"The shot-wound festered—as shot-wounds may
In a steaming barrack at Mandalay.
The left arm throbbed and the Captain swore
'I'd like to be after the Boh once more!'"

Septic fever supervenes and he becomes delirious:

"The fever held him—the Captain said
'I'd give a hundred to look at his head!'"

Babu Harendra hears him and hankers for the rupees but is too cowardly to attempt to earn them. The Captain is invalided, goes to a hill-station and takes him a wife:

"And she was a damsel of delicate mould,
With hair of sunshine and heart of gold,
And little she knew the arms that embraced
Had cloven a man from the brow to the waist.

And little she knew that the loving lips
Had ordered a quivering life's eclipse,
Or the eye that lit at her lightest breath
Had glared unawed in the Gates of Death.

For these be matters a man would hide,
As a general rule from an innocent bride."

Meantime Babu Harendra is wending his way in the rearmost cart of the Government bullock train when the Boh and his followers attack the convoy. There is a fierce fight with the escort:

"But Fate had ordained that the Boh should start
On a lone-hand raid on the rearmost cart,
And out of that cart, with a bellow of woe
The Babu fell—flat on top of the Boh!

For years had Harendra served the State,
To the growth of his purse and the girth of his *pêt*
There were twenty stone, as the tally-man knows,
On the broad of the chest of this best of Bohs.

And twenty stone from a height discharged
Are bad for a Boh with a spleen enlarged.
Oh! short was the struggle,—severe was the shock—
He dropped like a bullock—he lay like a block;

And the Babu above him, convulsed with fear,
Heard the labouring life-breath hissed out in his ear."

Repeated attacks of malaria cause great enlargement of the spleen, and a large proportion of the natives of malarial districts are so affected. This is a perfect picture of extensive rupture of the spleen with severe internal hæmorrhage causing rapid death. Harendra then hacks off the head of the Boh, and sends it in a packing-case to O'Neil with the finest example of a Babu's letter ever rendered into verse, asking for the rupees. The case arrives at breakfast time:

"Their breakfast was stopped while the screwjack and hammer
Tore wax cloth, split teak-wood, and chipped out the dammer;
Open eyed, open mouthed, on the napery's snow,
With a crash and a thud rolled—the Head of the Boh!"

O'Neil's wife who is with child four months (this is very cleverly expressed) is terribly shocked and faints. From time immemorial it has been believed that impressions strongly stamped on the mind of a pregnant woman may imprint a physical simulacrum on the child, and at intervals cases are reported in the medical journals lending colour to the belief, as for instance, when a woman frightened by a one-armed man brings forth a child with congenital absence of an arm. In this instance the child is born with a superficial birth-mark, or congenital nævus, on its shoulder, resembling the contour of the Boh's head.

"And this is a fiction? No, go to Simoorie
And look at their baby, a twelve-month old Houri,
A pert little Irish-eyed Kathleen Mavournin—
She's always about on the Mall of a mornin'—
And you'll see, if her right shoulder-strap is displaced,
This: *Gules* upon *Argent*, a Boh's head, *erased*!"

As in heraldry "gules" means red and "argent" white, the description of the red birth-mark against the child's white skin is very apt. The term "erased" is also used in heraldry where an object, such as a head, is separated from the body it belongs to leaving a jagged edge, and the Boh's head *was* so separated. But Kipling also intended the word to be interpreted in a second sense. At the time the poem was written these birth-marks were usually treated by obliterating or *erasing* them by electrolysis, and because the position of this one would render it specially unsightly electrolysis would have been almost surely carried out. It is a good example of Kipling's genius for playing on the double meaning of a word and blending the parlances special to two apparently unrelated subjects.

His Conception of the Doctor's Duty

The dominant force that lies behind medical work is often ascribed to conscious benevolence, whereas it is something quite different. Medicine disciplines its followers—not by order or drill as a regiment disciplines its men, but by the power of its traditional aims. The result, however, is the same—an automatic habit of thought and action which continues to work long after conscience and courage have gone by the board; and the doctor who struggles out of his sick-bed to see a patient far less ill than himself; or from an island shieling to the boat bound for the mainland, carries in his arms a case of typhus; or allows a mosquito known to be infected with yellow fever to bite him, in order that the disease may be further studied, is embarrassed when his deed is lauded on the score of humanity and courage. He knows that its mainspring is a habit of duty, so long engrained, that it has become subconscious. This and the nature of the experiences through which the doctor's mentality is attained were well known to Kipling, as the following unpublished verse shows:

"'Such as in Ships and brittle Barks
Into the Seas descend,'
They see the glories of the Lord
And wonders without end.
But such as heal the sick and maimed,
Do meet more manifold
Amazements, in one midnight watch,
Than all the oceans hold."

You will observe that he quotes the first two lines from a previous poem of his.

In 1908 he delivered an address to the students of the Middlesex Hospital which in eloquence and understanding is by far the finest appreciation of the medical profession ever written, and almost every

sentence of it might be used as a text on which to found a dissertation. He described doctors as:

"Your permanently mobilized army which is always in action, always under fire against Death."

and whose business is:

"to make the best terms you can with Death on our behalf; to see how his attacks can best be delayed or diverted, and when he insists on driving the attack home, to take care that he does it according to the rules of civilized warfare."

The same conception of the doctor's function recurs in the following unpublished verse written, I believe, many years afterwards:

"Man dies too soon, beside his work half planned.
His days are counted and reprieve is vain.
Who shall entreat with Death to stay his hand;
Or cloke the shameful nakedness of pain?"

The last line is very wonderful. The speech went on to recite the obligations of the profession:

"In all times of flood, fire, famine, plague, pestilence, battle, murder or sudden death it will be required of you that you report for duty at once,"

and then its privileges:

"If you fly a yellow flag over a centre of population you can turn it into a desert. If you choose to fly a Red Cross flag over a desert you can turn it into a centre of population towards which, as I have seen, men will crawl on hands and knees."

You must remember that the South African War was only six years distant. He ended thus:

"I do not think I need stretch your patience by talking to you about the high ideals and lofty ethics of a profession which exacts from its followers the largest responsibility and the highest death rate—for its practitioners—of any profession in the world. If you will let me, I will wish you in your future what all men desire—enough work to do, and strength enough to do the work."

What finer wish could be uttered to an audience of young men?

Of all doctors, those who devote themselves to research are, I think, the highest type, for not only are the rewards small, but years of strenuous thought and labour may be expended only to find that the path followed to seek for knowledge leads nowhere or comes to a blind end. Kipling has voiced this as only he could voice it: these are the lines, unpublished as yet:

"Send here the bold, the seekers of the way—
The passionless, the unshakeable of soul,
Who serve the inmost mysteries of man's clay,
And ask no more than leave to make them whole."

The interest Kipling took in medicine covered not only its present but its past and its future. In "Our Fathers of Old" he sings of the ancient physician-astrologers:

"Yet when the sickness was sore in the land,
And neither planets nor herbs assuaged,
They took their lives in their lancet-hand
And, oh, what a wonderful war they waged! . . . .
None too learned, but nobly bold
Into the fight went our fathers of old."

These held that the universe and all it contains is one in ultimate essence and that happenings in the whole are reflected in the individual man who forms a part of it. In the address that he gave to the Royal Society of Medicine in 1928 he dwelt on this doctrine and, looking into the future, said:

"Is it then arguable that we may still mistake secondary causes for primary ones, and attribute to instant and visible agents of disease unconditioned activities, which in truth, depend on some breath drawn from the motion of the universe,—the entire universe, revolving as one body (or dynamo if you choose) through infinite but occupied space? The idea is wildly absurd? Quite true. But what does that matter if any fraction of an idea helps towards mastering even one combination in the great time-locks of Life and Death."

In the labyrinth of knowledge through which we thread our way science has already unlocked many doors, but a myriad remain through which we must pass, and who shall assert where or where not we may come to at last?—No doctor.

OVERFEEDING AND PROTEIN METABOLISM

A GROUP of workers at the institute of physiology of Glasgow University have recently recorded the results of experiments designed to throw light on two important points—the effects of overfeeding on metabolism and the relative values, to human adults and "young people," of the proteins of boiled and raw milk.[1]

In 1904 Chittenden of Yale startled physiologists with his "Physiological Economy in Nutrition," in which he maintained that the 15–18 grammes of nitrogen or 100 g. of protein considered by Voit and other early workers to be a minimum daily requirement was in fact very much more than was needed for the repair of waste tissues, and that the excess, although the non-nitrogenous part was available for energy requirements, mainly passed "from organ to organ, or from tissue to tissue, on the way to elimination, and we can fancy that liver and kidneys must at times rebel at the excessive labour they are called upon to perform."

The method of experiment adopted in Glasgow by Dr. Cuthbertson and his six fellow subjects who varied in age from 19 to 35 and in weight from 56 to 87 kg. (under 9 st. to 14 st.), was to reach a stable output of urinary nitrogen on a self-selected basal diet of white and brown bread, 100 g. of fresh butter, cheese, 500 ml. raw milk, apple jelly, and raw apples. The water intake was kept constant. Some subjects received lettuce and tomato in addition. The daily protein intake varied from 0·82 to 1·21 g. per kg. of body-weight, and the calories supplied from 34 to 52 per kg. A stable condition having been reached, the excess ration was superimposed; it consisted of either 1000 ml. of raw or boiled milk, or in a further series, beef, lactose, and butter, with water, this being dissimilar from the milk supplement only in the nature of the protein. An attempt to use a soya preparation as source of extra protein was closed after five days because of difficulty in consuming it.

All seven subjects showed a large retention of both nitrogen and sulphur after taking the extra food. The difference between raw and boiled milk was not significant, either after a one-day surfeit or after a surfeit prolonged for eight days (two subjects only). Subject 5, in the longer experiment, showed decreasing retention as the experiment progressed. As he was 35 years of age he may be presumed to have finished growing, but his younger companion, who was only 19, seems to have made permanent use of the extra protein. A substantial, but less, retention of nitrogen was observed with beef and with the soya-bean preparation. It is worth noting that the calcium retention was, for raw or boiled milk, only about 6 per cent. of the excess ingested, and the authors point out that their experiments have no reference to the general merits of raw and boiled milk, but only to the relative retention of protein from them.

Further experiments were directed to making clear the relative protein-saving effect of fat and carbohydrate. It is obvious that the thermostatic and work-output requirements of the body can only be

[1] Cuthbertson, D. P., McCutcheon, A., and Munro, H. N. (1937) *Biochem. J.* **31**, 681; Cuthbertson and Munro, *Ibid*, p. 694.

met by the provision of combustible material. Fats, carbohydrates, and proteins will all burn, and there is some ground for the view that intake of protein might be reduced to that required for repair of wear and tear in the body or that amounts above this might be retained for future use, if either fat or carbohydrates were supplied in greater amount than is required to maintain body-weight. Apparently the only work showing the relative effect of addition of fat and carbohydrate to an apparently adequate diet is that of Voit in 1869. The present authors find that the effect of carbohydrate in sparing already metabolised protein is about half as much again as that of fat, but it seems that fat was more readily acceptable.

These investigations carried out on and by human subjects who chose and thrived on a basal diet on which they reached equilibrium are of greater value to the dietitian than similar experiments on the lower animals which have to make the best of what they can get and whose nervous systems are less affected by fads or idiosyncrasies. The diets chosen are hardly typical of the food of people—certainly not of medical students—in these islands and the subjects were few. The only exercise they took was short and fairly uniform walks which may partly account for the rather low diet which satisfied them. Allowing these criticisms, the important fact is established that the human system can, when circumstances permit of a rather fuller meal than usual, store for future use some of the extra "goodness" taken in. Further, if one cannot afford extra first-class protein one may do well to take extra fat and carbohydrates; in fact, a lot can be done by eating bread and butter. The stored nitrogen may be distributed over the body, but Cuthbertson and his collaborators incline to think that much of it is kept in the liver.

AN ADJUSTABLE BED-CUSHION

THE Dunlop Rubber Co., Ltd. (Cambridge-street, Manchester), now make an adjustable bed-cushion from their Dunlopillo material. It is shaped like a thick wedge but can be bent in the middle so that

BOLSTER LEG REST

the thicker end of the wedge is doubled in thickness. The accompanying drawings show the cushions used as a bolster (opened out flat) and as a head-rest or leg-rest (one half folded laterally on the other). Dunlopillo cushioning is firm but soft as a support and is described as porous, self-ventilating, moth-proof, and dustless. The bed-cushion is 3 feet wide (unfolded).

HOLIDAYS FOR WORKING WOMEN

THE following letter reaches us from the Women's Holiday Fund: "May we once more appeal to those now enjoying all the delights a holiday brings, on behalf of the working women of London living in crowded homes and noisy streets, among dingy surroundings? A short respite from monotonous drudgery and the struggle to carry on in the face of almost overwhelming odds would bring fresh courage and health to many a tired and harassed wife and mother. But the so much needed holiday is beyond her reach, even though at times the longing 'to get right away' becomes unbearable. The narrow margin of money for the necessities of life in thousands of poor homes does not allow of such a luxury as a fortnight's holiday. Even by dint of saving a small sum weekly the cost is beyond the means of most. Last year through the help of the Fund, which was founded 42 years ago, 1400 women obtained seaside holidays—over 700 took with them babies or small children (under 5 years of age). The society has now two homes of its own for mothers and babies, at St. Leonard's and Littlehampton, and in addition makes use of other suitable seaside homes and lodgings. . . . The society is making every effort not only to maintain its existing work but to extend it. An urgent appeal is therefore made for donations (however small), so that a still larger number of weary women may have the refreshment of a holiday by the sea. Two pounds will pay for a mother and baby for two weeks."

The appeal is signed by the Bishop of London, the Dowager Countess of Leven and Melville, Sir George Blacker, The Rev. Father Devas, The Rev. J. Scott Lidgett, and Mrs. Alfred Loder, chairman of the executive committee. Donations should be sent to Miss Cooper, Denison House, Vauxhall Bridge-road, S.W.1.

A REVISED LIBRARY CLASSIFICATION

THOSE who regard the international decimal classification as inadequate for medical libraries, and yet hesitate to add to the numerous existing systems by inventing one of their own, will doubtless welcome the second edition of the classification used in the Vanderbilt University Medical Library.[1] It was originally intended for the documentation of a large collection of reprints, a purpose which the international system might have served equally well. As revised for use on the general medical library, however, this classification certainly has merits, though in many ways C. C. Barnard's scheme[2] seems preferable. An important and new feature is the comprehensive index with over 2000 entries, but the value of this has been considerably reduced by the maze-like collation of the indexed pages.

Births, Marriages, and Deaths

BIRTHS

FLEW.—On June 10th, at Heath-street, Hampstead, N.W., the wife of Dr. J. D. S. Flew, of a daughter.

GAYUS.—On June 10th, at a nursing-home in London, to Dr. Irene Kenworthy Gayus—a son and daughter.

SOPER.—On June 7th, at High Wycombe, Bucks, the wife of Flight-Lieut. R. L. Soper, R.A.F. Medical Service, of a daughter.

SPICER.—On June 3rd, at Kampala, Uganda, the wife of Dr. J. R. Spicer, of a son.

MARRIAGES

GAWNE—SVOBODOVA.—On June 12th, at St. Mary's, Cadogan-gardens, Douglas W. C. Gawne, M.B., to Anna Maria Svobodova, daughter of Ladislav Svoboda, of Popovic, Czechoslovakia.

MORTON—WOODHEAD.—On June 8th, at St. Ethelburga's, Bishopsgate, Harold James Storrs Morton, M.D., to Nancy Sybilla Vincent Woodhead, of Aldbury, Herts.

NEWTON-DAVIES—WHITTAKER.—On June 9th, at the Priory Church of St. Bartholomew-the-Great, London, Lieut.-Col. C. Newton-Davis, M.C., I.M.S., to Mrs. Kathleen Mary Whittaker, widow of Squadron Leader J. T. Whittaker, M.C., R.A.F., of Belfast.

WILLIAMS—CROCKER.—On June 10th, at Parkstone, Hugh Morgan Williams, F.R.C.S., to Jean Esmé Crocker, of Parkstone.

DEATHS

COGAN.—On June 9th, at Northampton, Lee Fyson Cogan, J.P., M.R.C.S. Eng., L.R.C.P. Edin., in his 89th year.

COLLINSON.—On June 9th, at Preston, Frederick William Collinson, M.D., F.R.C.S. Edin., in his 84th year.

DAVIDSON.—On June 12th, at Guildford, George Edward Davidson, M.B. Camb., of Shere, aged 59.

RIDLEY.—On June 8th, at Leicester, Nicholas Charles Ridley, R.N. (retd.), M.B. Lond., F.R.C.S. Eng.

WALDMEIER.—On June 2nd, in London, Frederick John Waldmeier, L.S.A. Lond., M.R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

[1] A Classification for Medical Literature. Second edition. By Eileen R. Cunningham. Nashville, Tenn.: Cullom and Ghertner. 1937. Pp. 104. $2.00.

[2] See *Lancet*, 1936, **1**, 961.